DOCUMENT RESUME

ED 352 049 IR 054 272

AUTHOR Helal, Ahmed H., Ed.; Weiss, Joachim W., Ed.
TITLE Libraries and Electronic Publishing: Promises and Challenges for the 90's. Festschrift in Honor of Richard M. Dougherty. Proceedings of the International Essen Symposium (14th, Essen, Germany, October 14-17, 1991). Publications of Essen University Library, 14.
INSTITUTION Essen Univ. (Germany). Library.
REPORT NO ISBN-3-922602-15-0; ISSN-0931-7503
PUB DATE 92
NOTE 250p.
PUB TYPE Books (010) -- Collected Works - Conference Proceedings (021)

EDRS PRICE MF01/PC10 Plus Postage.
DESCRIPTORS Academic Libraries; *Cataloging; Change Strategies; Computer Networks; Copyrights; *Electronic Publishing; Financial Support; Higher Education; Information Networks; *Library Role; Library Standards; *Organizational Change; Preservation; *Research Libraries; Technological Advancement; *User Needs (Information)
IDENTIFIERS *Electronic Document Delivery; Electronic Text

ABSTRACT

The goal of the Essen symposium was to bring together internationally recognized librarians and library automation specialists to discuss new developments in electronic publishing. All 16 papers included in this collection were presented at the conference: (1) "Barriers to the Introduction of New Technology" (J. Andrew Braid); (2) "Nudging a Dinosaur in Order To Avoid Library Extinction (Richard M. Dougherty); (3) "Are Libraries Ready for Electronic Document Delivery?" (Johan van Halm); (4) "Electronic Journals and Document Delivery: Chances and Risks" (Ulrich Korwitz); (5) "The Global Library: The Impact of High-Speed Networks on Libraries" (Bonnie Postlethwaite); (6) "Integrated CD-ROM-Retrieval Networks: How To Automate the Post-Processing of Downloaded Export Files" (Christian Heinisch); (7) "Identification of Electronic Documents: The Diversification for Document Supply and Its Consequences for Document Description" (Achim Osswald); (8) "Full Text Imperatives for the National Library of Scotland" (Bernard Gallivan); (9) "Electronic Publishing: Possibilities, Barriers, and Environment in Slovenia and Past Yugoslavia" (Nada Cucnik Majcen); (10) "State of Art and Current Trends in Library Automation in Scandinavia" (Hans-Eric Malmberg and Elisabeth Ehrnstrom); (11) "Libraries and Electronic Publishing: Issues for Academic Library Administrators To Address" (Donna L. McCool and Maureen Pastine); (12) Use of Library Material in Both Paper and Electronic Media in a University Library" (Sigrid Reinitzer); (13) "Information Services for the Public" (Jennifer Walton); (14) "Optical Disk Based Document Delivery at the Congressional Research Service of the Library of Congress" (Ruth Wust); (15) "Hypermedia in the Library: Design Guidelines Based on Assessment Tests" (Eva Bertha and Erich J. Schwarz); (16) "Conclusions and Comments (Maurice B. Line). The publication also contains an introductory preface; the agenda of the seminar; a list of participants; and a list of participating vendors. (KRN)

ED352049

Veröffentlichungen der
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Libraries and Electronic Publishing: Promises and Challenges for the 90's

Edited by
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Joachim W. Weiss

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Veröffentlichungen der
Universitätsbibliothek Essen
ISSN 0931-7503

Publications of
Essen University Library
ISSN 0931-7503

Edited by
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Joachim W. Weiss

Vol. 1
Current Trends in Serials Automation
3-922602-01-0

Vol. 2
Hierarchical Relationships in Bibliographic Descriptions
3-922602-05-3 (out of print)

Vol. 3
Workshop zur Benutzerschulung
3-922602-03-7 (out of print)

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continued on last page

Richard M. Dougherty

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Essen University Library

Libraries and Electronic Publishing: Promises and Challenges for the 90's

14th International Essen Symposium
14 October - 17 October 1991

Festschrift in honour of
Richard M. Dougherty

Edited by

Ahmed H. Helal
Joachim W. Weiss

Universitätsbibliothek Essen
Essen 1992

Libraries and electronic publishing : promises and challenges for the 90's ; Festschrift in honour of Richard M. Dougherty / 14th International Essen Symposium 14 Oct. - 17 Oct. 1991. Ed. by Ahmed H. Helal ...
Essen, 1992. - 204 S.
(Veröffentlichungen der Universitätsbibliothek Essen ; 14)

ISBN 3-922602-15-0

NE: Essen Symposium <14, 1991>; Helal, Ahmed H. [Hrsg.]; GT;
Dougherty, Richard M.: Festschrift

© 1992 by Universitätsbibliothek Essen

Essen University Library

Organization and publication: Doris Pohl
Layout: Annelore Ax
Printed: Postberg Druck GmbH, Bottrop

ISSN 0931-7503
ISBN 3-922602-15-0

Authors are responsible for the choice and the presentation of their manuscripts

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14th International
Essen Symposium 1991

Essen University Library

Libraries and Electronic Publishing: Promises and Challenges for the 90's

14 October - 17 October
1991

Preface

The 14th International Essen Symposium 1991 was held at Essen University Library during the period from 14 to 17 October, 1991, with full registration of 91 participants from 14 countries. The goal of Essen Symposium is, as in the previous symposia, to bring together internationally recognized librarians and library automation specialists to discuss new developments in electronic publishing. Librarians, publishers and users are the components of this co-existence.

The potential impact of electronic publishing and expected changes in existing library procedures will face us regardless of possible acceptance by librarians or disruptions to existing databases. Electronic publishing will strengthen sharing of resources and indirectly stimulate an increase in usage for all libraries and information centres; the final aim is to provide universal access to information.

This year the symposium was held in honour of Dr. Richard M. Dougherty, an internationally recognized authority on library management and information technology. The theme of the 14th International Essen Symposium was "Libraries and Electronic Publishing : Promises and Challenges for the 90's".

Dr. Richard M. Dougherty is a graduate of Purdue University with a B.S. in Forestry. He has received his MLS (1961) and Ph.D. (1963) from Rutgers University. He is currently Professor of Information and Library Studies at the University of Michigan, Ann Arbor. He previously served as Director of the University Library of Michigan from 1978 until May 31, 1988. During the 1984-85 academic year he also served as Acting Dean of the School of Library Science (now the School of Information and Library Studies). Other positions he has held in the library profession include Head Acquisition Department, University of North Carolina, Chapel Hill; Associate Director of Libraries, University of Colorado, Boulder; and University Librarian, University of California, Berkeley, from 1972 to 1978. He was Professor of Information Studies at the Graduate School of Library and Information Studies, Syracuse University, New York, and he has served as a visiting Lecturer at several other library schools. He founded Mountainside Publishing Inc. in 1974, and serves as its President.

A native of Indiana, Dr. Dougherty has been active in the profession for many years and is currently Immediate Past President of the American Library Association. He has also served on the Executive Boards of both the American Library Association and the Association of Research Libraries. He currently serves on the Executive Board of the Society for Scholarly Publishing. He was a member of the Board of Governors of the Research Libraries Group and served as the Chairman of the Board during 1986-87. He has been active in the International Federation of Library Associations and Institutions (IFLA).

Dr. Dougherty is the author of several books, most notable Scientific Management of Library Operations (2nd ed.) and Improving Access to Library Resources. He has edited several journals including College and Research Libraries. In 1975 he launched Mountainside Publishing Inc. and began editing the Journal of Academic Librarianship which he continues to edit. Mountainside Publishing also publishes Research Strategies and Library Issues: Briefings for Faculty and Administrators.

He was named Academic Librarian of the year in 1983 by the Association of College and Research Libraries, won the Esther J. Piercy Award in 1969 for his early achievements in technical services, and was 1988 the first recipient of ALA's Hugh C. Atkinson Award for outstanding achievement as an academic librarian in the areas of library automation and management. In 1991 his alma mater awarded him a Doctorate of Humane Letters honoris causa.

The rapid development of the capability and availability of computer devices, new dimensions of artificial intelligence, software- and hardware-packages, networks, standards, etc. are opening new dimensions for electronic publishing. We are currently in the initial era of experimentation.

Online databases, CD-ROM, and electronic publishing will not cause libraries to abandon print subscriptions in the foreseeable future. In the short-term, the fears of publishers are not realistic as their major source of revenues will remain print sources. But the longer term picture is not so clear. In the last twenty years online sources have had not a dramatic impact on printed works. CD-ROMs single or networked will not replace both print and online services. In fact, producers don't care so long as they are still reaping profits. However, the ultimate distinction is the universal usage of electronic information.

The demand for electronic publishing is being accelerated by a number of factors: the evolution of bibliographic utilities on regional and national levels; local online catalogs that offer more than the traditional catalog; the new era of CD-ROM version of databases by multi access in network environment; cuts in budgets, and the remarkable increase in subscription prices.

The technology of optical publishing is already understood by librarians. There are many formats of optical publishing which range from videodisc, compact audio discs, CD-ROM, etc. The expected revolution will be in the CD-ROM area by networking on PC environment. Databases which were previously available online or in print now have been published in CD-ROM-format. Advanced networking and data communications will link together university campuses and research centres. Electronic networks will ultimately be a vehicle that will lead to the "virtual library".

In the 1980s considerable attention and effort has been devoted to electronic publishing. The one side of the coin is how to make it attractive and profitable for publishers. The other side is to meet the expectations of librarians and patrons who want electronic publishing, i.e. the demand side. Simply, electronic publishing allows information to be transmitted quickly by using computers and telecommunication procedures thus by passing the delays associated with printed versions. The final aim is document delivery to a library or directly to patrons. In other words, the basic difference between electronic publishing and normal publishing is in the way information reaches the requester.

In the last few years there is an increasing use of and interest in the burgeoning dimensions of electronic publishing and publications. Electronic publications can be journals, newsletters, hypercard stacks, or digest newsletters (academic discussion lists and interest groups are also part of electronic publishing). Electronic information exchanges started in the 1970s with personal communication, group conferencing, article and document publishing, article editing, etc.

Electronic publishing's primary aims are to create and build up available online databases complementing existing printed sources, i.e. to provide immediate availability of information in electronic form to every user and at any time; an indirect profound effect on the academic libraries, education, research, and society. A university campus network completely wired can offer more effective setting up of an information community.

Electronic publishing is mainly based on two components, the author and the reader. Librarians have only to provide the channels for electronic publishing, i.e. the information services that new technology can afford and will bring. Users should have faster access to published articles and to results of research that are reported or published in journals. This can only be achieved by electronic publication where new findings can be accessed as immediately after been reviewed and accepted, thus providing the latest new findings directly to subscribers.

Abstracts as part of the database will help users to make a judgement whether the needed article is really needed before the full text is processed and the reader has to pay. Real statistics about needs/ demands and about the volume of traffic will help librarians and centres in setting up policies.

Librarians are looking for ways to provide electronically full text of heavily used journals, i.e. the core group of journals. This means the full text would be stored either locally, in a national centre or in a regional utility centre. Full text would be stored as an image of the pages and not as characters. The libraries, in this case, should provide full text displays for the workstations or at least to a local printer. Systems like APOLLO or ADONIS have been experimental efforts by institutions which are intended, mainly, as systems for electronic document delivery of full text articles from centres to libraries or directly to the users.

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Publication of electronic journals is beginning to occur. However, the processing of electronic journals from ordering to cataloguing is still not possible. Not many libraries are able to process electronic journals but by far most libraries are in the planning stages of developing procedures to process these journals.

The impact of electronic publishing technologies on research, document delivery services, legal issues, libraries and librarians, standards, etc. was discussed and reviewed during the 14th International Essen Symposium 1991. Libraries are working to establish a balance between information technology and user requirements. It is clear that electronic publishing will gradually become a dominant source of specialized information. The success of electronic publishing will be determined by end user reactions.

Electronic publishing is already generating legal problems including legislation on information privacy, censorship, copyright, etc. The solution will be a complex array of bilateral agreements even within the EEC; copyright problems and/or royalty fees must be seriously considered.

Electronic publishing must go hand-in-hand with standards of scientific journals and immediacy of online technology. Standards are always a most important concern for librarians. Marketplace vendors should strongly support these activities. Some problems have already been solved.

Standards are also important to develop methods for improving document identification, transaction procedures, and quick delivery. However, the first step, namely, having a standard method of direct and unique identification of journal specific issues of serials which is not yet internationally introduced. This means that orders and claims can not be processed electronically. The creation of such an international identification standard down to the article level with summary and subject headings will be revolutionary in the interlibrary loan procedures and document delivery. Some publishers have already developed standard methods for presenting the journal down to the issue level by an identifier in bar-coding on the cover of the journal issues. This method allows an easy automatic check-in, processing, claiming, etc. since it is the most compact code that can handle and process alphabetic and numeric characters.

It is hoped that electronic publishing will help us serve the information needs of the academic community in this decade and into the 21st century. In the preface of: Publications of Essen University Library, vol. 6, p. 8, 1983, it is cited ... "The age of electronic libraries and electronic publishing will speed up the integrated interaction among authors, publishers, users, and libraries who may act as intermediaries ..." Or ... "Let us face the year 2000 courageously; it is only a matter of time that the electronic society replaces the paper society ... ". Now, technologies are ready for the complete process of electronic publishing.

The purpose of the librarian's initiatives is to make the efficient sharing of databases within the library and across the campus. The more successful librarians are in offering and providing services, the more expectations the patrons expect. However, electronic publishing and advanced developments in information technology are not without problems. The speakers pointed out some of these problems such as accessibility, copyright issues, fees, continued funding, standards, etc.

For academic libraries this means that they have to stay one tep ahead of users' wishes, not only in meeting present needs but also planning for future needs and demands. Poor services create tensions within the university campus. The philosophy of better services, as judged by patrons, is mainly based on goodness of results. This depends on the accuracy and detail of information offered by the library, timeliness in getting results to patrons, and how much emphasis is put on the user wishes, needs, and the personal touch. In achieving the best results in academic libraries we have to recognize that it is the customer's perception that defines the library and its services.

Librarians are seriously interested in introducing the most advanced services and adapting new technologies not because they are techno-lover's librarians but because librarians see technology as providing a means to improve the quality of services. However, we have to keep in mind that the complexity and sophistication of the new tools might discourage some patrons from making any use of all existing machines and techniques.

It is hoped that this publication provides interested colleagues who did not have the advantage of attending the 14th International Essen Symposium 1991 with information for a better understanding of the conference topic. As in the previous symposia, the papers, concepts, ideas, and discussions were indepth, informative, stimulating, and relevant for librarians.

We extend our thanks to all speakers, participants, and vendors who made the 14th International Essen Symposium 1991 a success and who honoured our distinguished colleague Dr. Richard M. Dougherty.

Essen, January 1992

A. H. Helal
J. W. Weiss

14th International
Essen Symposium 1991

Essen University Library

Libraries and Electronic Publishing: Promises and Challenges for the 90's

14 October - 17 October
1991

Agenda

Monday, 14 October

10.00	Registration
11.00	Vendors presentation
15.00	Opening of Symposium **Ahmed Helmi Helal** **Joachim W. Weiss**
Chairman:	**Nancy Melin Nelson**
15.15	Barriers to the Introduction of New Technology **J. Andrew Braid**
16.00	Discussion Coffee
16.45	Vendors presentation
19.00	Reception

Tuesday, 15 October

Chairman:	**Look Costers**
9.30	Nudging a Dinosaur in Order to Avoid Library Extinction **Richard M. Dougherty**
10.15	Discussion Coffee
10.45	Are Libraries Ready for Electronic Document Delivery? **Johan van Halm**
11.15	Electronic Journals and Document Delivery: Chances and Risks **Ulrich Korwitz**
11.45	Discussion
12.15	Lunch break
Chairman:	**Janet Mitchell**
14.00	The Global Library: The Impact of High-Speed Networks on Libraries **Bonnie Postlethwaite**
14.45	Discussion Coffee
15.15	Integrated CD-ROM-Retrieval in Networks: How to Automate the Post-Processing of Downloaded Export Files **Christian Heinisch**
15.45	Discussion Coffee
16.15	Identification of Electronic Documents: The Diversification of Document Supply and its Consequences for Document Description **Achim Osswald**
16.45	Discussion
19.00	Reception

Wednesday, 16 October

Chairman:	**Ronald M. Schmidt**
9.30	Full Text Imperatives for the National Library of Scotland **Bernard Gallivan**
10.15	Discussion Coffee
10.45	Electronic Publishing: Possibilities, Barriers, and Environment in Slovenia and Past Yugoslavia **Nada Cucnik Majcen**
11.15	State of Art and Current Trends in Library Automation in Scandinavia **Hans-Eric Malmberg and Elisabeth Ehrnström**
11.45	Discussion
12.15	Lunch break
Chairman:	**Shmuel Sever**
14.00	Libraries and Electronic Publishing: Issues for Academic Library Administrators to Address **Donna L. McCool and Maureen Pastine**
14.45	Use of Library Material in Both Paper and Electronic Media in an University Library **Sigrid Reinitzer**
15.15	Discussion Coffee
15.45	Information Services for the Public **Jennifer Walton**
16.15	Discussion
19.00	Reception

Thursday, 17 October

Chairman:	**Terence H. Cannon**
9.30	Optical Disk Based Document Delivery at the Congressional Research Service of the Library of Congress **Ruth Wüst**
10.15	Hypermedia in the Library: Design Guidelines Based on Assessment Tests **Eva Bertha and Erich J. Schwarz**
10.45	Discussion Coffee
11.00	Conclusions and Comments **Maurice B. Line**
12.00	Close of symposium

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Essen Symposium 1991
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14 October - 17 October
1991

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XXXVII

14th International
Essen Symposium 1991
Essen University Library

Libraries and Electronic Publishing: Promises and Challenges for the 90's

14 October - 17 October
1991

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Barriers to the Introduction of New Technology

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2

Barriers to the Introduction of New Technology

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Abstract

New technology, optical disks, wide band networks etc., will have a marked impact on many library processes. One of the processes which stands to benefit most is the supply of full text of material to remote users. The Document Supply Centre of the British Library (BLDSC) has over 5 years experience of experimenting with and using such systems.

During that time BLDSC has experienced many problems; some of these are trivial, others, at the present time, are insurmountable. This paper examines the causes of some of the barriers and the way in which they have been overcome. The paper gives many examples of the projects using new technology which have taken place at BLDSC. These include the ADONIS system for the storage of full text on CD-ROM, the transmission of documents over Integrated Services Digital Network (ISDN), satellite links and academic networks and the in-house use of scanners and storage systems.

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Barriers to the Introduction of New Technology

Introduction

When I received the preliminary announcement for this Symposium I realised that it is 3 years since I was last here. I stopped to think about what has happened in that time. In some areas great steps have been taken, but in others very little progress has taken place. Why is this? I thought that it may be useful to share my views on the answer to this question with you.

The title of this talk may be somewhat unusual and sound negative in outlook. This is not intended to be the case. For several years BLDSC has carried out various experiments in the implementation of several types of new technology for document supply. In the course of carrying out these trials a series of problems have been encountered. I want to relate our experiences to you in the hope that you may recognise some of the symptoms before you face similar difficulties. You may even be able to avoid them completely.

First, I should make clear what I mean by new technology. Use of the word "new" implies that the technology must be changing. In some respects this is true, but I want to limit the definition as follows. It is the use, in libraries, of computers and other devices to allow more than simple data manipulation of bibliographic data, in fact to allow the manipulation of the full text of documents. Manipulation includes the storage and transmission of such material in electronic format.

Of course, this technology will not be new for ever. In several years time we shall have a whole new set of new technology. That will give me the opportunity to come to Essen in another 3 years and talk to you about something else. On the other hand some people here today may not regard the technology about which I want to talk to you as being at all new. For instance, facsimile transmission may not now be regarded as a new technology. When would you say it ceased to be a new technology? Last year, 2, 3, 4, 5, 10, 20, 50 or even 100 years ago? Facsimile transmission was first demonstrated by a Scottish physicist, Alexander Bain, in 1841. So when did it cease to be a new technology? I would argue that any technology can be regarded as new until it has been accepted into every day life. Therefore, facsimile transmission has spent the most part of its life as a new technology and it is only very recently that it has ceased to be deserving of the name. In fact, so recently that I wish to include it as a new technology.

My justification of this is that, as far as libraries are concerned, facsimile transmission is still a new technology. That is, very few libraries are using it for document delivery. Even those who are using it are not using to a great extent. So perhaps my talk should be titled "Barriers to the successful application of any technology in libraries". Unfortunately, time does not allow me to cover such a vast subject as I would have to cover such things as catalogue cards, microfilm, even pens as well as computers etc. So I will limit my talk to the application of new technology for document supply.

This definition is a fairly simple one because only a few years ago there was very little use of any form of computer based technology in any area of document supply with the major exception of document searching and ordering. Perhaps a few minutes reflection on why this is so may be useful.

There are many types of information, printed, audio, visual etc. I wish to limit myself to printed information but even then there are several different classes - text, tables, graphs, drawings, pictures etc. Today computers can easily cope with text, tables and graphs. Drawings cause some problems and pictures can be exceedingly difficult to produce, store or manipulate on a computer. That is using character encoding techniques. But another technique, that of facsimile encoding, or bit mapping, can quite happily cope with any class of material on a printed page - even colour. In order to do this a page is converted into an electronic image. This can then be stored, transmitted or manipulated in many ways. Computers have been available for some time now - why is it only recently that documents have begun to be stored and transmitted in this way? The reason is very simple: the amount of data that is created by facsimile encoding is much greater than with character encoding. Recent technological advances have allowed the capture, processing, storage and transmission of these large volumes of data.

There are several technologies involved such as high volume optical storage devices, broadband telecommunication systems, scanners, laser printers and most importantly desk top microcomputer. In combination, this equipment will allow many tasks to be performed which as little as 10 years ago could either not be carried out at all or could only be performed at slow speed or on very expensive main frame computers.

The British Library Document Supply Centre

For the benefit of those of you who are not familiar with it, I thought it would be worthwhile to give a small explanation of what BLDSC does. The Document Supply Centre is the largest organisation in the world which is devoted to the supply of documents to remote users. To give an idea of the scale of the operation, each year it receives some 3.3 million requests. These are for all types of material but mainly for articles from scientific and technical periodical publications. As a result of this many of the satisfied items are despatched as photocopies. Over the last 30 years BLDSC has refined its acquisition policy to have available in its own stock those items which are known to be most requested by other libraries. It has refined this to the stage where it can now satisfy almost 90% of all the requests it receives from its own stock. It can satisfy a further 5% from the holdings of other libraries both in the UK and overseas.

BLDSC subscribes to over 50,000 serial titles, acquires some 40,000 monographs each year and many other types of material and has a total stock exceeding 150 km. BLDSC has over 14,000 users, about half of these are in the UK and the remainder spread throughout the world. Apart from the transmission of requests to BLDSC (almost 60% now come by some automated means) most of the processes remain on manual basis. There are many reasons for this including:

> document supply and ILL do not have a high profile in libraries and therefore not a great deal of investment has taken place. Compare this to the relatively high level of investment which has taken place in the development of automated systems for monograph acquisition and cataloguing.
>
> BLDSC developed its systems in the early 1960's, at which time there was little automation in libraries. The systems which BLDSC developed were very simple and did not expect any form of automation on the part of its users.
>
> there was little or no competition to the services which BLDSC provided. This is still the case within the UK but there are now similar systems developing in other countries.

Reasons for BLDSC using New Technology

There are two principal reasons for BLDSC using new technology. The first reason is related to the last item above - that of competition.

Technology allows many new players into the field of document supply. In theory, anybody could set up a service supplying documents from a back yard. Many articles are now available in electronic format and BLDSC could face competition from potential new suppliers. These new suppliers could supply documents from an electronic store at a price which would undercut traditional suppliers. As the documents which would be available in electronic format would be the most popular, and most current items, only requests for older and less popular items would be sent to traditional sources of supply. This type of request is more difficult to process and the effect of this would be that these suppliers would have to increase their prices and thus become even more uneconomic. BLDSC therefore wishes to maintain its competitive advantage by using new technology.

But, new technology also brings potential benefits in cost saving. I will cover these in more detail later, but if the integration of the ordering, processing and delivery systems can be achieved, then a fully automated process could be implemented with tremendous potential for cost saving.

BLDSC's Use of New Technology

Before I go into detail on some of the problems let me first outline BLDSC's experiences to date in the application of new technology. I will then use some of these applications later to demonstrate some of the barriers and how they were overcome.

The first area of new technology which was used at Boston Spa was the use of facsimile transmission for document delivery. Trials began in the late 1970's with a machine which was a forerunner of the CCITT group 3 facsimile standard. These trials were very limited because a proprietary protocol was used. In 1982 we purchased two fully compatible CCITT group 3 standard machines and carried out a 6 month trial with Chalmers University of Technology. The trial was very successful for the time. Pages were transmitted at an average speed of less than two minutes per page and we had to retransmit about one page in four because of quality problems. On the strength of this experiment we decided to offer a value added facsimile delivery service in the UK. We were somewhat surprised to discover that the average transmission time was slower within the UK than it had been in transmitting to Sweden. A valuable lesson had been learned - never assume anything especially when computers or telecommunications are involved.

The inherent problems with group 3 transmission, slow speed, low resolution, etc., meant that it was suitable only for urgently required items. Ways of overcoming the problem, essentially that of insufficient bandwidth in the normal telephone network, were sought. We first explored satellite transmission. For several years we were involved in the Apollo project for satellite based document delivery. This was a joint European Commission (CEC) and European Space Agency (ESA) project. In 1987 it failed for political rather than technical reasons. One of these was that the CEC decided to devote all its resources to the development of ISDN. This was thought to be of value to BLDSC as in 1986 we had begun trials with Group 4 facsimile transmission. (In fact, we probably transmitted the first ever Group 4 facsimile document over a public network anywhere in the world in September 1986 - that is now over 5 years ago.) Group 4 facsimile overcame all of the drawbacks of group 3 as far as document delivery is concerned. It has higher resolution, prints on plain paper, has a more efficient compression algorithm. Unfortunately it uses ISDN.

ISDN, unlike the normal analogue telephone network, uses a digital transmission medium. These have only become available in recent times. In 1986 we experienced considerable difficulty in establishing an ISDN connection between Boston Spa and London. These problems were not resolved as quickly as we had hoped and even now we only have a small number of connections in the UK as well as a connection to Chalmers University and Finland.

This frustration in the implementation of ISDN caused us again to look for alternatives. In 1990 we were approached by British Aerospace who were about to launch a satellite system for document delivery. We carried out a trial in Spring 1991 to three of our industrial customers in the UK for 3 months. Again the trial could be regarded as a success but it raised more questions than it provided answers.

As a result of these trials we feel that we could offer a much better service to our customers if we were able to deliver directly to their desk rather than delivery to the library from which the document would have to be delivered by conventional means. We have begun discussions with the

Joint Network Team in the UK to explore the possibility of document delivery over JANET, the UK academic network. We hope to begin a pilot service before the end of this year. This has become possible because of a recent upgrade of JANET.

Whilst we were carrying out these trials with various forms of electronic document delivery, we also began experiments with the electronic storage of documents. This was a part of the ADONIS system about which I spoke the last time I was at the Essen Symposium. The trial ended at the end of 1989. By this time we had processed over 20,000 requests from the system and the sites throughout the world had processed some 50,000 altogether. We had also taken delivery of a CD-ROM jukebox. In 1991 ADONIS launched a new system. Technically the differences are minor compared with the trial system, but commercially there are some significant differences. The new ADONIS is aimed not at document supply centres but at end users. There is a target market of pharmaceutical companies and around 400 titles on the system which are geared towards the pharmaceutical industry. The new ADONIS system has only been available for a few months and it is too early to say whether or not it will be a success.

We now have the new ADONIS system at BLDSC but we have also begun trials, initially as part of the satellite trial, in the electronic scanning of documents. We are developing a small database of images to explore problems of the capture and indexing of articles.

Outside my definition of new technology, but forming an integral part of our future planning is the work which we are carrying out on automated request processing. (It is outside my scope because it uses "old" technology, but is included because it will integrate closely with much of the new technology which we are planning.) BLDSC now receives almost 60% of its requests in electronic format. Some time ago it was decided to change the existing manual processing systems to take advantage of the fact that requests were in electronic format. Initially a system based on barcoded request forms was developed to enable us to reply more quickly to requests. More recently a system which automatically matches requests against our holdings has been implemented. In those instances where a match is found requests are sorted into the picking order for the shelf. This is a process which takes a considerable amount of time and human resource and is now being done to 95% accuracy by a computer. For serials the next stage will be to match at the article title level rather than the journal title. This is something which we have already succeeded in doing in the DOCMATCH project. For a variety of reasons this is not applicable on a large scale. But if we can implement such a system it will give us the basis for a totally automated document delivery system.

I seem to have spent a great deal of time in talking about systems which have been or are being developed at Boston Spa. I want now to move on to some of the barriers but I shall use our past experiences as illustrations so I hope the explanation will have been useful.

Barriers

The following barriers are in no particular order. You may find some things which we find to be major obstacles are of little importance, whereas other things which I do not mention are major barriers. The list is not selective.

1. High Risk

This is a very common excuse. In many instances it is not the root cause of a barrier. Other causes are often hiding behind this excuse. At BLDSC we have a policy of not employing any new technology until it has been commercially available for about 18 months. If a longer delay is imposed it may well be that the opportunity is lost. Timing can be of the essence in new technology implementations. However, even if fairly stable products are chosen there can still be problems. Our use of Group 4 facsimile is a good example of this. We deliberately waited until both the equipment and the supporting network, a forerunner of ISDN in this case, had been available for sometime. The problem was that nobody had used them together before! As I said earlier we almost certainly transmitted the first page in the world over a public network using Group 4 facsimile. With hindsight this was certainly a high risk venture - it was some three months before we transmitted the second page.

So beware even when taking supposedly stable new technology if you are planning to use it in an innovative way.

2. The technology can't be integrated

There are two types of integration of new technology. One is at the technical level. Problems should be fairly obvious at an early stage. It can be seen as simply as having the wrong plug to fairly sophisticated but easy to spot problems. I shall deal with these type of problems later with issues of standardization.

There is another form of integration. This is at the operational level. New technology often demands that processes are carried out by entirely different means than conventional methods. It is easy to think that it will be a simple job to introduce new technology in replacing old working practices. This may well be the case if the whole process is being replaced. Often great benefits can accrue in cases where this can happen. It may be an entirely different story when new technology is used as part of a process. Here there can be many problems.

A good example of this was our use of the trial ADONIS system. At the time BLDSC was processing some 12,000 requests every day. 1% of those, 120 per day, were for the ADONIS system. The manual system was geared to directing all 12,000 requests to the correct storage area. It could not cope with splitting off 1% for different treatment. We tried to overcome this problem by placing the ADONIS workstation near to the stock. BLDSC has over 150 km of stock spread over 4 buildings and 6 levels. One of the virtues of ADONIS is its small size. It does not spread around very easily. So we had to find ways of diverting requests to the workstation. We marked all the stock on the shelf for those requests which got that far. This had the effect of greatly slowing down the processing of the requests, even to the extent of making it slower than the conventional method. With hindsight this is very easy to see. In the euphoria of getting a new system, in the case of ADONIS one that has had an extremely long gestation period, it is very easy to overlook these simple problems.

For the new system we are at least aware of this problem. We are still thinking about how to make the best advantage of ADONIS. Initially planning to use it in those cases where the original item is on loan until we have the automated matching system working. It may be that we never process postal requests by ADONIS.

3. Too Expensive

Whilst it may offer many cost savings, most new technology is expensive to implement. There are exceptions to this. CD-ROM drives are a good example. They are cheap because they are closely based on audio CD players. These now enjoy a mass market and hence are cheap. This is a fairly rare example in the field of new technology. The basic component of many systems is the microcomputer and the price of these is falling rapidly. But there are many specialist and expensive peripheral devices - scanners, laser printers, WORM drives which are still very expensive. Systems often require more than one of these devices, eg. a scanner, a WORM drive and a laser printer. These peripherals often cost many times more than the basic processor. Manufacturers are also reluctant to build in these devices although again CD-ROM drives are a notable exception to this.

High cost is closely related to risk. If a solution will cost a lot of money, then the risk of implementing it will be greater. Careful investment appraisals should be carried out to ensure that systems really will be cost effective. Don't be afraid not to implement a new technology system if it does not show significant benefits. Remember that no system will be implemented in the time scale or the budget originally estimated. If in doubt, don't do it.

4. Don't want to be first

There is a great deal of sense in this. Buying the first ever facsimile machine must have been an act of great faith. Nowadays things should not be so bad. Especially if you adopt the policy of trying not to adopt high risk solutions. The danger is in carrying out this policy to excess. You may get left behind and find out that others have adopted the solution which you were thinking about. As a result they may gain a competitive advantage which you may find impossible to regain. Technological changes can occur with amazing rapidity. If you don't keep up you may be lost for ever. Whilst this may be far more applicable in a commercial context, it can also happen in libraries. At present we do not have an example of this to demonstrate - if we have I may not be able to come and speak to you again. But there are small scale examples in many libraries over things such as CD-ROM versus on-line access to databases and in many other areas.

5. Standards

There are two aspects to standardization. The most common one is a lack of standardization. I shall deal with this first before presenting a counter view.

Lack of standardization is a very common problem in the use of new technology. It is almost inevitable in fast moving developments that adherence to standards is difficult if not impossible. Again, CD-ROM is an exception. But cast your mind back 3 or 4 years when the CD-ROM standard was being developed. For over a year very few products came out. But some did and survived. The original ADONIS system did not adhere to the CD-ROM High Sierra standard. But it did not really matter. ADONIS was a stand alone system. Provided that the correct system was used it worked and it worked well. The reason that a non-standard system was chosen is that it was the only one available at the time. The new ADONIS system does adhere to the High Sierra standard for CD-ROM file formats. In practice it makes very little difference. ADONIS have to go to extra lengths to protect their system as the last thing they actually want is for anybody to pick up a disc and print articles from it. Standards are important when taken in the proper context. Exchanging bibliographic records for example. It is important to be certain of the content of a record or file. But do you really need a system which is compatible with every other system if you have a totally self contained system?

Adhering to standards can be very expensive. Suppliers have spent a long time in making systems which are proprietary. They have spent 20 years or more in making systems which lock you, the customer, into their own system. They claim that this policy will make systems cheaper. Making systems which are conformant to Open Systems standards can be very expensive. It is a not impossible task to make two dissimilar systems talk to each other, but then there may be a third, fourth and so on. Also, each has to have the ability to talk to each other. Open Systems Interconnection (OSI) takes the concept much further than simply different systems communicating with each other and introduces the concept of distributed processing. This means that interconnection of different systems becomes an extremely complex task. As an example in the USA work began almost 10 years ago on the Linked Systems Project (LSP) to link the systems of LC, OCLC, RLG and WLN. Even today, although developed to the status of a US standard, Z39.50, with notable exceptions between the major utilities little actual implementation has taken place.

BLDSC has been involved with others for the last 4 years in the development of the OSI ILL protocol. Note the period of time. The ILL and SR protocols have just received full ISO status as standards. Until that time nobody would consider implementation, but even now a lot of work still has to take place in the development of internally agreed profiles. This is the work that the International Forum on Bibliographic Systems (IFOBS) has been doing for the last 3 years. The resource required in these tasks is considerable. The development of International Standards is very time consuming. But there are benefits. In BLDSC's case we have influenced the content of the ILL protocol and made it better meet our needs. At the present time BLDSC receives requests in several formats as well as its proprietary ART format. If all customers were to adopt the ILL protocol then there would be a single format. This is obviously an ideal state and for several reasons may never be achieved.

Take care if you are thinking of implementing OSI conformant systems. Ensure that the considerable additional cost is worthwhile.

6. Cross Market Issues

It can prove incredibly difficult to implement a new technology system if it does not fit exactly into a market sector. Thus, if you are a bank and require a banking system or if you are a library and require a cataloguing system, there are usually not too many problems in finding a system which will suit your particular needs. However, if the system which you wish to implement cuts across several disciplines there can be problems and if you wish to serve several different market sectors as well then the problems can be greatly increased.

We have come across this problem at BLDSC in our trials with electronic document storage and delivery. There are three areas: document image processing (DIP), facsimile transmission, and wide area information systems (WAIS). Each of these has an associated, but different market (Fig 1). The system that we are developing has facets of all three areas and we have customers in all three sectors. So far, some attempts have been made to link facsimile to both the other areas but there has not been a great deal of success. It is an area where standards are of great importance. Images produced on a DIP system will have to be transmitted over the WAIS or else to a facsimile machine. BLDSC has been involved with TIB in Germany, Pica in the Netherlands, the Ministry of Higher Education and Telesystemes in France and OCLC and RLG in the United States in the Group on Electronic Document Interchange (GEDI) which has recently produced a report with agreed standards for electronic document interchange. When implemented this will allow scanned images to be interchanged on a worldwide basis using both research and public networks. We hope to make a trial implementation of the recommendations next year.

7. Legal Issues

In many cases the legality of carrying out a certain task is not affected by the method of performing that task. There are many examples of processes being automated which are still as legal (or illegal) after automation as they were before. Electronic document delivery does not fall into this category. I am not sufficiently conversant with the Copyright Law of Germany so I shall limit my remarks to the situation in the UK. BLDSC produces photocopies under the Fair Dealing Clause of the UK Copyright Act. This allows a single copy of a single article to be made by a library on behalf of another person provided that it is required for research or private study. The wording of the Act is very precise and only allows single copies of individual articles. BLDSC also now offers a Royalty Paid service as well. Under the terms of this service multiple copies of articles or more than one article from the same issue can be copied but a fee is paid to the UK Copyright Licensing Agency which is responsible for crediting the copyright holder, normally the publisher in the case of journal literature.

The Act is quite clear that it does not permit any other form of reproduction. This includes the electronic storage and transmission of page images. Many organisations have attempted to overcome this problem, but none, other than for experimental purposes, have managed to solve it. The reason is that publishers, quite understandably, are keen to protect their revenues. They are very reluctant to enter into any agreements in which these revenues may be threatened. The wide availability of articles, together with quick and easy access, in electronic format is seen by publishers as a tremendous threat to their future financial viability. They have just cause for their concerns. Imagine for a moment an extreme case. Suppose that a single library subscribes to a journal and then scans and stores the contents. The library then makes the contents instantly available to any other library via high speed networks. No other library need subscribe to the journal with a consequential loss of revenue to the publisher. The immediate effect would be that the journal would cease to be published unless the publisher could secure the same level of revenue.

One consequence of the above is that authors will begin to semi- publish articles directly onto research networks. There are dangers in loss of editorial control, etc. if this should occur and it is unlikely that such articles will be indexed and abstracted to the same extent as with conventional publishing. Authors may then lose the cudos from traditional publishing. It is quite conceivable that a form of anarchy may break out.

In such circumstances one may be forgiven for not wishing to proceed with the implementation of a new technology. But there are many driving forces that make its implementation inevitable. The views of publishers must be taken into account. A confrontational approach will serve no useful purpose. Systems which meet the needs of publishers will have to be found. These will involve some form of payment to publishers to compensate for the potential loss of revenue. Users and libraries alike should be prepared to pay for the value added by this process. Many organisations, including BLDSC, are developing strategies to overcome the problem.

8. People

I said at the start that the barriers were in no particular order. But I have left what I consider to be the most difficult obstacle to the last. That is the human barrier. People are most reluctant to change. Arabic numerals were introduced into Europe about 1,000 years ago and yet in certain circumstances we still use Roman numerals. Organisational problems will be the biggest barrier to be overcome in the implementation of new technology.

There are many reasons for this. A very strong one is that the use of the technology could make people redundant. At BLDSC over 400 people are directly employed in the servicing of requests. If we could automate the entire process, which is extremely unlikely I might add, then the great majority of these people would be out of a job. Even a small scale implementation could reduce the number employed. Indeed, the reduction of staff numbers is a strong driving force for BLDSC to implement the technology. We also face a problem with our customers. The technology will allow the ordering and delivery of documents directly by end users. This will miss out the librarian. In existing systems they perform a vital role in regulating and helping the end user. In the implementation of the technology librarians will have a vital role to play. If they are threatened they will not help in this essential process. It will be necessary to retrain librarians in the skills that the new technology will require.

It is also important to keep everybody concerned informed as to what is happening and why. We have many examples of problems which have arisen from not doing this. The best example probably concerns our attempts to make a Group 4 facsimile connection with Sweden. The first page we transmitted was received but thrown away by the operator who thought that it was some rubbish which had arrived rather than the first page which had ever been transmitted by Group 4 from the UK to Sweden.

Conclusion

I may have laboured on many of the barriers. It may have given the impression that we will not proceed with any implementation of new technology. This is not the case. We shall make progress. As I said at the start, I decided to give this talk for a positive reason. That was to help you, either to avoid some of the problems or if you find that you do have the problem then we may have already found a solution to it.

In spite of any barriers which may occur, progress will still be made.

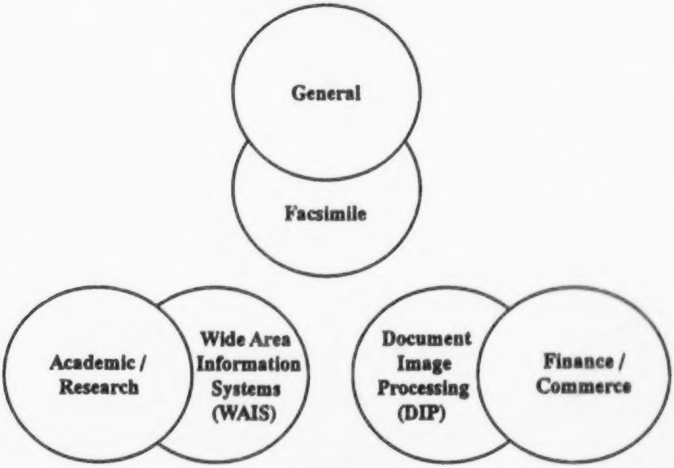
General
Facsimile
Academic / Research
Wide Area Information Systems (WAIS)
Document Image Processing (DIP)
Finance / Commerce

Figure 1

17

Nudging a Dinosaur in Order to Avoid Library Extinction

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Abstract

Electronic publishing promises to drastically reshape the world of scholarly communication. One can already point to a variety of pilot projects. If successful, how would these projects be transformed into a new system of scholarly communication during a time of campus political and financial uncertainties?

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Nudging a Dinosaur in Order to Avoid Library Extinction

Most western libraries have enjoyed an extended period of growth and prosperity. While there have been momentary pauses, the long-term pattern has been one of sustained growth. We have seen collections double and even treble in size. We have witnessed the growth, adoption and utilization of a variety of computer-inspired information technologies. Overall, the last fifty years has been quite a remarkable era for libraries.

I believe, however, we are at the end of this growth era. The portents of change surround us. We have left the industrial age and entered the information age as Daniel Bell told us would happen, and this transformation may well tear asunder the fabric of society as we understand it.[1] Harlan Cleveland, in writing about how the new technologies are already forcing fundamental changes in the structure of organizations, uses the phrase "the twilight of hierarchy" to convey a sense of the fundamental changes that are reshaping contemporary organizations.[2]

It is important to keep in mind that we aren't talking about developments that are going to transform us sometime in the future; we are referring to developments that are already reshaping our organizations and the environments in which they operate. For example, consider the worldwide impact CNN had during the recent Middle East conflict and on the recent events in the former Soviet Union. The impact of these changes in libraries are evidenced by that fact that we are overextended, overcommitted, feel underfunded and unable to fulfill our missions as well as we could have a few years ago.

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[1] Daniel Bell, The Coming of Post-Industrial Society: A venture in social forecasting. New York: Basic Books, 1973.

[2] Harlan Cleveland, "Twilight of Hierarchy: Speculations on the global information society." In Information Technologies and Social Transformation. Bruce R. Guile, Ed. Washington D.C.: National Academy Press, 1985. p. 61.

In my judgment we will experience change no less significant than was experienced by society during the years following the invention of movable type. What is vastly different is the time-span in which the changes must be absorbed by society. The post-Gutenberg era lasted decades, whereas today we talk about change occurring in a matter of months or a few years. It's hard to imagine that the personal computer age dawned only a decade ago, and now some technologists are talking about desktop workstations with the power of 100 MIP processing power. And, of course, we casually talk abut the wonders of the 21st century; the new millennium has become a metaphor for the "new world," and yet the 21st century is a mere eight years away. Incredible. Considering the short period of time involved, it behooves us to begin now to prepare ourselves, our profession and our organizations. How much change can we realistically expect to absorb?

Library futures are not easy to predict but I think most would agree that libraries will have to accommodate new publishing systems including on-demand publishing and document delivery systems. Libraries will have to acquire and provide access to an expanding number of documents in electronic formats. The nineties will signal the end of the library era in which ownership of collections reigned supreme in university librarianship. Librarians will increasingly depend on information accessed and retrieved from distant locations in order to supplement local holdings.

How will parent institutions react to the forces that are buffeting traditional libraries? Will they serve to facilitate change or will they become obstacles to the process? It is certainly the case that libraries can't operate as free agents. They must have the support of their entire campus communities in order to achieve the fundamental changes that many now predict are essential to have libraries continue as important providers of information. At many universities in the United States, the key to reform lies with the traditional faculty reward system. Today, research followed by publication drives the academic reward system; teaching and university service is of secondary importance. If the reward system were restructured to give greater monetary recognition to teaching and service, this reform alone would lead to momentous change in libraries and in scholarly publishing. A reduction in emphasis on publishing would serve to change the mission of libraries to have greater emphasis on service and access and less on acquisition and ownership. Libraries would be in a better position to function as campus information agencies that would eventually serve to supplant the traditional role of libraries. Again, realistically speaking, how much change is likely to occur during the next eight years?

The changes that futurists envision will generate enormous resistance from many quarters. Academic institutions are deeply rooted in tradition. In fact, universities are among the most stable organizations that western society has produced:

> Taking, as a starting point, 1530, when the Lutheran Church was founded, some 66 institutions that existed then still exist today in the Western World in recognizable forms: the Catholic Church, the Lutheran Church, the parliaments of Iceland and the Isle of Man, and 62 universities. Universities in the past have been remarkable for their historic continuity, and we may expect this same characteristic in the future. They have experienced wars, revolutions, depressions, and industrial transformations, and have come out less changed than almost any other segment of their societies.[3]

Most American universities have not demonstrated a voluntary willingness to transform themselves in spite of the immediate threats of unfavorable student demographics and persistent funding problems. But we know change is possible. British universities were forced to change as they grappled with a decade of financial cutbacks. In the United States, changes in government policy have stimulated change on occasion. For example, thirty-five years ago, when the Soviet Union launched Sputnik, the U. S. government reacted by launching the era of Big Science on university campuses. These policy changes also triggered what has come to be known as the "publish or perish syndrome" that drives scientific and technical publishing. My point is that, while change will be difficult because there are so many involved stakeholders, change is also possible because universities will respond when their future is in jeopardy.

The situation in libraries is not drastically different. Librarians are not known as change agents, nor are they known to be risk-takers. Nonetheless, if you examine closely the information environment on most university campuses, you will find, I believe, that the library has adopted and is using information technologies much more than outsiders realize or even more than librarians themselves appreciate. But like their parent institutions, most librarians have not transformed their organizational structures, policies, and procedures in ways that reflect the strengths, capabilities, and limitations of the new technologies. There is still much work to be done.

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[3] "Three Thousand Futures: The Next Twenty Years for Higher Education." Final Report of the Carnegie Council on Policy Studies in Higher Education. San Francisco: Josey-Bass Inc., 1990. p. 9.

Scope of the Presentation

This symposium provides a rich menu of information and organizational perspectives. Some presentations deal with specific technologies such as optical disk, electronic document delivery systems, and hypermedia. Others focus on specific organizations such as universities or national libraries. A few presentations are more relevant to specific geographical areas, such as Yugoslavia and Croatia. My presentation focuses on general environmental considerations. The paper does not deal with specific technologies or specific organizational changes. My purpose is to consider the issues from a macro point of view. For example, when I use the term "electronic publication," I use it as a metaphor to represent the transformation of libraries and information centers from traditional paper-based organizations to those with a greater electronic media orientation.

I also include a disclaimer: Libraries in each of the countries represented at this symposium will, of necessity, achieve their desired futures differently. Individual futures will depend upon national governmental policies and demographics of the population. There are no universal solutions. But it is possible for each country to develop strategies that are efficacious to its national goals and which reflect its institutions' best interests. That, in my judgment, is what the participants of this symposium have in common.

Environmental Assessment

Like many people, I enjoy trying my hand at predicting library futures, but, similar to the crystal gazing of most futurists, my predictions don't prove to be prescient. But if I were to ask you to think about the future and to develop a vision of what you would like to see happen--that is, your preferred library future--I am confident each of you could do this successfully. For example, if I were to ask you to project yourself into the future and to envision what you would like your campus library to look like in ten years and how it would operate, I'm sure most of your visions would include provisions for electronic information, computer technology, and network technology. The specifics of your visions are not really as important as the fact that most of us do share elements of a common vision. And we would agree that it is a vision that is desirable and likely to occur.

As we plan for the future, we must also pay attention to the here and now. We must give careful consideration as to what specific actions are required now in order to ensure that our sought-for preferred futures can be transformed into realities. Furthermore, we must also take into account how our preferred futures are likely to impact various stakeholder groups. By stakeholders I mean publishers, editors, scholars, scientists, administrators, librarians, computing center directors, governmental officials, etc.--all those who have or feel they have a stake in campus information infrastructure of the future.

For a moment, let's briefly examine different groups to see how they might initially react to the prospect of creating a highly networked, electronic information-oriented environment:

Technologists. There would be great excitement among those technologists who were active in developing the tools and shaping the organization of the new infrastructure. But others would view such a future with trepidation, for example, programmers who find their tools becoming obsolete, or computing center managers who view the disappearance of mainframe computing as a professional threat.

Librarians. Under persistent economic pressure imposed by publishers' pricing policies, many librarians are already actively lobbying for the creation of more electronic information tools. Others are actively searching for alternatives to the current publishing system. These librarians view any alternative more desirable than a continuation of the current publication cost/price treadmill. But other librarians see their traditional jobs threatened, for example, the reference/bibliographer and technical service positions. Others see enormous and demanding changes in their future. Some will respond positively, others will adopt passive/aggressive behaviors and resist changes.

Chief Academic Officers (CAOs) or whatever the local equivalent is called. Most CAOs are not yet fully cognizant with library and information issues. For many, according to one recent survey, the importance of creating national research and information networks ranks low in their list of priorities. While some CAOs are anxious for libraries and computing centers to reform, these issues are still not as important to them as several competing issues, including the need to improve the quality of undergraduate education, preserving or restoring the physical infrastructure of campus buildings, and maintaining enrollments in the face of a declining student population.

And yet, paradoxically, some CAOs view the world of electronic media as a way to avoid further physical expansion of library facilities. Other CAOs have come to realize that the world of technology is costly to create and costly to maintain. They are beginning to ask how and in what ways information technology is improving the quality of education. Chief academic officers want librarians to implement programs of change, but we must remember these same CAOs do not view "library and information resources" as a top priority on campus. This ambivalence among CAOs will make efforts to implement programs of change particularly challenging for librarians.[4]

Scholars as Users. Most faculty are not yet convinced that electronic media signal a better age. They still view immediate accessibility to paperform publications as preferable to any other alternative such as cooperation or electronic access. Most faculty are still not yet directly affected by the electronic media, and among those who are, the majority needs to be convinced that the world of electronic information means easier and quicker access to information.

Scholars as Authors. Scholars become quite concerned about copyright and royalties when they are creators of information. The same concern does not seem evident when they are the seekers of information. The advent of electronic publishing, however, poses challenging new questions about copyright and literary property. Although scholars are only beginning to raise questions about information in electronic formats, it is likely that they will raise more questions and concerns as a greater number of articles appear in electronic publications. Who owns copyrights is certain to raise thorny issues in the days ahead.

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[4] The issues are discussed more fully in: Richard M. Dougherty and Carol Hughes, Preferred Futures for Libraries: A Summary of Six Workshops with University Provosts and Library Directors. Mountain View, CA: The Research Libraries Group, Inc., 1991.

Publishers. Publishers are already very concerned about the implications of electronic media. Most don't fully appreciate what are the economic implications. They know they should be involved, but they are afraid involvement could cost them a great deal of money, and what's worse, they cannot yet see how they can return a profit on their initial investments. Some large commercial and society publishers are already deeply involved in research and development projects. But the key term is "uncertainty." For example, will universities seek to become more active as distributors of information, and, if so, will they take steps to retain economic and intellectual control? Will government continue to support university research at recent levels of expenditures? These are all issues under current debate.

It's unlikely that any stakeholder group would deny the inevitability of a changed campus information environment. The stakeholders are certain to differ on how the changed environment will evolve, who will play which roles, and over what timeframe the transformation will take place. And while such specific questions can't be answered now, those who are active in the movement should make every effort to convince the various stakeholders that all of them stand to benefit as a result of the transformation. In a very real sense, the challenge is to convince the potential foot-draggers to join with the innovators in seeking change.

Obstacles to be Surmounted

Obstacles loom large on a number of fronts. None is necessarily insurmountable, but in the aggregate they are formidable. And, unfortunately, some of the current band of technologists tend either to ignore or underestimate their impact. For example, visionaries talk about the wonderful world of electronics and all it can do, but if you ask them whether they have the funds to achieve their visions or if they have even identified the sources, they become silent. In many instances, the technologists haven't even convinced their parent institutions to underwrite development costs. To achieve an electronic information environment, most organizations will have to reallocate funds. How many institutions have reached this conclusion? How many feel that new visions will be achieved with the infusion of new funds only? What is needed is a realistic assessment and a plan of action to overcome the obstacles that lie ahead. The following is simply a selection of the more obvious:

Economic and Human Resources. The need for financial resources is obvious and has already been mentioned. One must also underscore the need for qualified staff. For many campuses, the absence of leadership and technically qualified individuals may prove to be the biggest drag on progress in the long term.

Technology. Can the technologists deliver products in a timely manner? Will they be convenient to use, will they be attractive to users? Possibly most important, will they be simple to use? The track record on these important considerations heretofore has been spotty, and technology too often has been oversold.

Legalities. There is a host of government regulations affecting communications that will have to be overhauled before a national research and education network can become a reality. For example, copyright is a creation of the print world. It has served creators and users reasonably well for many decades. There are differences of opinion, however, whether copyright can adequately provide safeguards in an electronic environment. We need to balance the rights of creators with the desire of many people to guarantee the public free access to a wide range of information.

Big Business is already beginning to stake out its claims. Some academic and information technology officials are afraid that the interests of Big Business will conflict with their objectives of creating a nation-wide publicly accessible electronic network.

Governance Concerns. There are a number of issues that one might cite. On campus, the faculty reward system itself will have a major impact. Current systems will have to be modified to compensate for electronic publications. And too, will there be a continuing struggle between the private and public sectors as to what roles each will play; will these two sectors struggle for roles of dominance? What will be the impact if such a struggle ensues?

Another related issue concerns the "fee or free" debate. Is information a public right or a public good? Or is information a value-added commodity? Since this is neither/nor resolution, these questions will remain central to the on-going negotiations.

Organizational Inflexibility. The contemporary library campus organization will often hinder rather than facilitate the creation of an electronic media environment. How will services be organized and distributed?

Who will organize information? And, most important, who will pay to support the system? These are not questions that will be quickly or easily resolved, particularly if change must be forged through the painful process of resource reallocation. Nonetheless, organizational change is necessary and inevitable.

The Grand Challenge

How do we get from where we are to where we want to go? How do we achieve our vision of a new campus information environment? How do we accomplish the objective in such a way as to create an excitement and a willingness to embrace the new technologies? And, in the best of all possible worlds, how do we convince government, state, and university officials to pay the bill? That indeed is the grand challenge, and to succeed, we need to adopt grand strategies:

Tailored Solutions. There are no universally applicable strategies. Strategies must be tailored to meet the special needs of individual organizations. Strategies should reflect government policies, local politics and traditions, the availability of funds and human expertise. While networks should reflect the local environment, they must also embody the principles of inter-operability and connectivity. A series of technological tubs sitting on their own technological bottoms is not a happy prospect.

The Transition Years. The most immediate challenge to universities will be developing strategies to manage the transition years. There will not be a sudden transformation from the world of paper to the world of electronics. For many years, campuses, libraries, and computing centers will have to maintain dual systems. Normally, dual systems increase the cost of the bottom line, and we can assume this situation will not be any different. While economies may be achieved, managing this phase of the transition is likely to prove expensive, organizationally complex and technologically formidable.

Fund Availability. The availability of funds will influence, if not dictate, what strategies an organization develops. Will additional funds be needed? If so, who will pay? Are these sources assured, or will they dry up? If additional funds are needed but not available, what aspects of the plan will have to be sacrificed?

The Global Strategy. An organization should develop a broad vision, and then through planning, transform the vision into a series of strategic directions. That is, what do the planners see as the campus' future? How will individual units contribute? Once strategic directions are identified, the campus can focus more sharply on developing specifics from generalities. The strategic planning process should enable the campus to: develop clear goals and objectives, identify specific activities and tasks necessary to achieve the goals and objectives, build support among involved constituencies, provide realistic timeframes for achievement, and ensure that the necessary resources will be available when needed. If all of these steps can be accomplished, strategic planning will prove to be a very powerful process.

In the process of implementing a strategic plan, particularly when technology is involved, we must resist the temptation to oversell the benefits and certainly avoid creating unrealistic expectations. Those directly involved in the planning process will find the going extremely difficult, often stressful, sometimes contentious, and frequently frustrating. And yet, if we step back and think about what has already been accomplished on our campuses with new information technologies, we realize that, in spite of the day-to-day struggles, considerable progress has been made already.

Conclusion

As we proceed toward the new millennium, we need to understand that the world of information is in the midst of a paradigm shift. Thomas Kuhn used the term "paradigm shift" to describe revolutions which occur when a new scientific discovery inexorably alters developments in an established discipline.[5] Whether we refer to the future as the "post-industrial age" or the "information age," we are creating our own paradigm shift--a new societal environment that will present society and its institutions with a host of challenges.

Librarians are about to enter an uncharted sea. We will create new systems for obtaining, organizing, retrieving, and disseminating data and/or information. Some say this new world will be dominated by knowledge workers. To the extent that this vision proves accurate, the work of information professionals such as librarians will play a critical role. But as exciting and uncertain as the world of information technologies may be, it is my belief that progress will not be dictated by technological advances. Technology has already outstripped our organizations' abilities to pay for and structurally absorb the tools available. Thus, progress is more likely to be measured by our ability to introduce and manage the the new tools envisioned for the post-industrial information society.

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[5] Thomas S. Kuhn, The Structure of Scientific Revolutions, 2nd Ed. International Encyclopedia of Unified Science, Vol. 2, No. 2. Chicago: The University of Chicago Press, 1970. p. viii.

Are Libraries Ready for Electronic Document Delivery?

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Abstract

The usage of any technological device depends to a large extend on the technological infrastructure of the user.

Most Electronic Document Delivery Devices, hereafter referred to as EDDD, are - still - in an experimental phase and most experiments do not cover the full EDDD chain. Furthermore these experiments are technology-driven, rather than demand-driven with adequate infrastructure supporting the success of the EDDD experiments.

Are libraries ready for Electronic Document Delivery?

1. Introduction

According to Cawkell[1] in his excellent survey about Electronic Document Delivery Systems, hereafter referred to as EDDS, "Electronic Document Delivery calls to mind telecommunication based distribution as a substitute for library loan or photocopy delivery services such as those provided by the British Library Document Supply Centre".

Cawkell also points out, that "the desirability of EDDS has been argued for years" and gives reasons for the slow progress of these services. The low acceptance has to do with a variety of factors, such as

- discrepancy between supply and demand
- the user environment infrastructure
- unwillingness to pay for information
- technological problems (at least until recent)
- the hesitating publishers role (rethinking the roles in the information chain of various stakeholders)
- shrinking library budgets
- expensive and unreliable telecommunication networks.

There still seems to exist a discrepancy between what the information market has to offer, and the specific information need of the consumer. This simply comes down to insufficient market orientation. Suppliers in the information sector have not yet become fully aware of the fact that the user has already acquired a pattern of information consumption which is supposed to be multi-medial.

Regarding the networks in the research environment one can observe a great deal of activity in the field of 'academic networks', increasingly leading to national and even international infrastructure for electronic scientific communication.

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[1] Cawkell, A.E. Progress in Documentation - Electronic Document Delivery Systems. Journal of Documentation (ASLIB), 47 (1991) 1 (March) p. 41-73.

It can be expected that the use of these infrastructure for accessing electronic information services at work will increase rapidly. This is confirmed by the expectation of the network-builders themselves (who even use access to bibliographic information as a sales argument), and by the fact that libraries and their organization are beginning to claim a role for themselves on these networks. Direct access by end-users to libraries and/or other information services depends on the availability of networks. Together with cost and acceptance factors, the telecommunications infrastructure would seem to be of great importance here.

2. Components of an EDDS

Within an EDDS we distinguish the following (interrelated) components

- the (online) marketing by the EDDS suppliers (how to know, where to order what)
- (online) ordering
- document processing
- transmission (dispatch) to the recipient and
- an accounting mechanism.

Taking into account these components we will define an Ideal Document Delivery Service.

Ideal Document Delivery Service (IDDS)

An Ideal Document Delivery Service (IDDS) should permit a user located virtually anywhere to link relevant citations as a result of an online/CD-ROM search to an electronic store of the corresponding documents. So, the request for a document is followed by an automated document retrieval process and then transmitted in an electronic form to the user, also entailing an automated accounting procedure. Examples of some experimental and prototype devices will be given. Data about EDDD usage will be discussed.

2.1 Where to order

Technically it is possible, that a user connected to a (research) network, like JANET, SURFnet, etc., could use some form of Directory service (x.500 standard) which would route the document request entry. For the time being it seems to make sense, that a requester knows where to order.

2.2. (Online)ordering

The ordering process - the most common part of an EDD - could have the form of telephone, fax, telex, videotext, ascii (online), e-mail or mail message. Most library suppliers and document supply services offer electronic services for ordering.

2.3 Document processing

After the ordering process we can distinguish three basic forms of EDD

- a priori digitalised document stores of publications also available in a printed format
  Examples: ADONIS, most full text CD-ROMs/WORMs
- on-demand digitalization of existing printed documents
  Examples: FOUDRE
- electronic published documents sec, incl. full text databases, which are available online or in a distributed form (CD-ROM, WORM, Laser Disc, Videodisc, diskette).

2.4 Dispatch to recipients

We distinguish the following distribution methods to the requesters

1. Direct electronic delivery:
   The requester will pick up an electronic copy of the images directly from the computer, once the requester is notified by the supplier of the file location.
2. Intermediate electronic delivery:
   Requester will review pages on one of the supplier nodes. If electronic format is required, staff will provide copies on diskette.
3. Print copy delivery:
   Supplier will review pages electronically and print copy for delivery to requester.

3. Outlook

In an EDDS the ideal workstation would have access to bibliographic and full text databases and would be able to receive transmitted data in a variety of forms

- fax
- data broadcasting
- audiotext

Such an integrated workstation will act as a "document server", whereby printing would be done at the user's work place.

A real break-through of EDDS might see a shift in functions of the stakeholders in the information chain, leading to

- a stronger centralization of document supply stores
- larger decentralized access to these stores
- a better control of copyright due to built in usage registration and accounting, as well as license agreements
- direct supply by publishers or by publishers* appointed supply centres, which will include subscription agents and to a lesser extent traditional libraries and booksellers.

Examples:

At present most EDDS services are experimental, see also appendix 1.

We forecast substantial growth, but EDDS will stay - at least for the time being - a minor activity of most libraries and document supply centres, when related to traditional document supply. The biggest issue remains the linking of demand and availability, whereby indirect DD services, like ADONIS, seem to have the brightest future, notably in large corporate and public document supply centres, as a critical mass of documents and users seems to be mandatory. Still EDDS will remain a fraction of all documents supplied, but we forecast high growth rates in the order of 20 to 30% in the next five years. So, where microforms didn't succeed (cumbersome), full text databases succeeded only partly (too expensive, too elementary (halftones and formulas are difficult to produce)), do have optical media a large potential for EDD services. However, libraries would be able to use this potential only, if they could convince their customers to create the appropriate infrastructure and the willingness to pay for a faster and more comfortable service.

*Publishers don't want to deal with thousands of accounting addresses?

Appendix 1

Experimental and just-started EDDS services

ADONIS	a DD service, which supplies articles of nearly 500 biomedical journals
BTUD	current contents, scanning, fax (one-action)
CAS DOCC	as Document Delivery Service
CompandexPlus	CD-ROM full text
Direct Fax	the Belgian business magazine "Trends"
Disclosure Plus	company information
EDDS	NLM
Faxon XPress	Document Delivery System for Journal and Serial Literature
HT-DICC	High-Tech Documentation Information & Communication Centre (KUB Tilburg)
KNAWb (Amsterdam)	WORM/fax project using TEARS
LOANSOME DOC	NLM
National Agricultural Library (NAL)	the transmission of digitized page images to remote sites
Newsfax	Extel's Examiner and Regulatory News Service (company information)
OATS	ISI's Original Article Tear out Service
Online Contents	digitalized article information (PICA, KB, KWB) with future fax and EDD service
TIB QUICK	on-demand digitalization after online-ordering from STN or TIB documents
De Tijd, Antwerp	Data broadcasting of Brussel's stock information

Editorial intelligence added to host services for direct fax supply

DIALOG	Thomas Register (company information)	FAXTEX 1
ECHO	TED (Tenders Electronic Daily)	TEDFAX

39

Electronic Journals and Document Delivery: Chances and Risks

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Electronic Journals and Document Delivery: Chances and Risks

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Abstract

Electronic publishing was formerly more or less an experimental form of private document exchange in the form of letters, personal notes, and news. It has established itself as an alternative or even independent publication form in the last few years.

By that, the libraries come in contact with the new media produced and have to face problems

- in the acquisition of electronically published materials
- in the organization of access for local users and
- in the fulfillment of orders as part of their document supply activities.

The author focuses mainly on journals published electronically in databases available in full text online and on CD-ROM (ADONIS) and shows the implications of these new products for libraries on their way to electronic libraries and for their customers.

Electronic Journals and Document Delivery: Chances and Risks

When in 1973 the MEAD corporation ironically being not a publisher but a company of the paper industry offered the first full text database LEXIS[1], the term "Electronic Publishing" had not yet been coined. Even in 1983, when Dr. Helal in wise foresight organized his first ESSEN SYMPOSIUM on electronic publishing the number of products which had come on the market was rather small.

Libraries had hardly noticed what was going on and were not concerned about electronic publishing and document delivery.

In the last years, the number of electronically published materials we have to acquire and to manage is increasing from month to month and the spectrum includes all subjects of research. To buy, to hold and to use a print medium is quite simple: you need money, space in the stacks and a photocopier. Before acquiring an electronic medium (book or journal) and getting access to it you have to think twice. Special equipment compatible to the product is needed and the staff and the customers must learn how to use the material. As software changes from product to product and from time to time a process of continuing education is necessary. When using electronically published materials for document supply questions of copyright may arise, too.

Following Oßwald[2], I would like to classify electronically published materials (mostly journals) into three form categories, give examples and examine in how far the material is usable for document supply and really used for it in our libraries.

Form Categories for Electronic Media

<1>	Electronic media produced parallel to the corresponding print media
>Variant<	: Tailor made collections of <1>
<2>	Electronic media based on print media but containing supplementary materials
<3>	Electronic media with no relation to print media

Form category 1: Electronic media produced parallel to the corresponding print media.

In this category we find most of the 2.400 online journals available via database hosts nowadays ((Fig. 1) and [3]). These databases are by far not used as often as bibliographical databases. One reason for this is the fact that people think downloading an article from such an online database is prohibitively expensive. This is not true. Unless an article is not excessively long not more than 3 to 5 DM are due[4]. Another reason for the non-acceptance is the fact that figures, graphics and halftones normally cannot be transmitted. In fact this may be an obstacle but not for every user. It is worthwhile to mention here that this problem has been solved - in principle at least: The exception is PATDPA, the German Patent Database[5]. It contains the texts of patents released but no figures - and you cannot understand a patent without the figures. Having found a relevant patent the main patent diagram can be captured through a file link to PATGRAPH containing the main patent diagram when using the specific software supplied by the host. The diagram is downloaded as vectorized file to the customers' PC and can be displayed and printed out. Although this procedure of downloading is a time consuming affair (3-5 minutes for one diagram with a transmission rate of 2.400 baud) it offers the only chance to make use of the patent text which refers to the diagram. The technology used was developed in connection with a project initiated by DOCDEL[6]. It proofs to be pathbreaking: the American Chemical Society is examining to implement the same feature for their full text database with 24 chemical journals online. When broadband digital networks (ISDN) will be installed in the next years figures, graphics and halftones will easily and quickly be transmitted. Then the customers and the libraries will remember the real advantages of full text databases which are: better retrieval (all words in the full text are searchable) and frequent update (the printed issues often are available weeks later). Even today - if the library's customer cannot wait for an interlibrary loan and the article does not contain graphics (this can be checked before downloading) or if the figures are not important for a first look - downloading for document delivery makes sense. In my opinion, libraries are fixed too much to bibliographical databases and do not really see the potentials of full text databases.

Form category 1 - variant -: Tailor-made collections of electronic media produced parallel to print media.

Media in this category often offer improved selection and presentation facilities. Examples of such collections are the "Comprehensive Core Medical Library" (CCML) issued by BRS as online pool of full text journals and ADONIS.

The host BRS offers about 70 medical journals and 17 textbooks full text online (Fig. 2 and [7]). Target group for this collection is the clinical physician, the medical library and the physician who has no access to libraries nearby. As special feature a link between the bibliographical database MEDLINE and the full text journals is build up: when searching MEDLINE corresponding full texts are found and displayed on demand without leaving MEDLINE (Fig. 3). Figures are omitted in the full texts but their captions are displayed to ease the decision whether a print-copy is needed or not.

In America, CCML is used for document supply in libraries, in Europe the number of users is rather small.

ADONIS is an example of a tailor-made collection of electronic full text journals published explicitly for document delivery. Because of this I want to go into some details here. 380 biomedical journals selected according to the demand of potential users, the pharmaceutical industry, are published parallel to the printed versions with all graphics and halftones on CD-ROM.

3 years ago on the occasion of the 11th ESSEN SYMPOSIUM, I reported about the first experiences with the trial version of ADONIS[8]. At that time the target group for ADONIS were large and important document suppliers. They found out that such a system of electronic document supply may be used as an alternative to the conventional photocopying but found it difficult to integrate ADONIS into their working environment. All parties made valuable experiences in the implementation of this kind of CD-ROM technology in libraries and learned about the organizational and technological barriers of new techniques. In this summer, ADONIS made the final step from a trial to an operational system. ADONIS became a non-profit-organization finanzed by four publishers (Blackwell, Elsevier, Pergamon and Springer). 28 publishers of biomedical and chemical journals were won as contractors who build up the journal pool.

Target group is not only the large document supplier or library but the end user, the pharmaceutical company itself. With ADONIS in use the subscription to the printed version of the journals involved can theoretically be given up.

Is ADONIS as a product of electronic publishing in its operational form an alternative in the process of document supply?

The Zentralbibliothek der Medizin as largest biomedical document supplier in Middle Europe subscribed to ADONIS in this summer and tested the system in the last months (Fig. 4 and 5). We cannot give a final answer because as to be expected ADONIS suffers from some teething diseases in its first year.

In our opinion the future of ADONIS will depend on 6 factors:

1 - the integration of the system in the user's in-house routines:

The customer has to sort orders in those to be fulfilled with the ADONIS system out of all others. The first step has been done: the ADONIS article identifier is added to the bibliographical data of EMBASE. But more is needed: Incoming orders must be matched automatically with the ADONIS-index and the search process should be started after that. As I heard the BLDSC is successfully developing such a system.

2 - reliability of the hard- and software:

Hardware: As the hardware configuration is the users' concern ADONIS can give only recommendations for a suitable workstation. By testing hardware components of different origin ADONIS should act as a test institute.
Software: Improvements to reduce search and print out times will always be welcomed.

3 - print-out quality:

The resolution of 8 by 12 lines per mm for text pages is not always sufficient - we had several complaints.

4 - the selection of journals included:

Due to technical reasons (compression methods do not allow to store more than 10.000 pages on one CD) and to political reasons on side of the publishers (even important publishers like ACADEMIC PRESS couldn't be convinced to join) not more than 380 journals build up the journal collection at the moment. As a document supplier we know that the demand for journals is distributed to thousands of titles - it remains to be seen if the collection is suitable this time. Some potential ADONIS customers are interested in special journal packages (for example journals related to specific biochemical methods or diseases) - a kind of diversification of journal packages should be offered by ADONIS. As publishers can withdraw some or all of their journals at the end of each year or add journals, a factor of uncertainty remains for the customers all the time.

5 - the speed of the document delivery process itself:

As the CD-ROM versions of the journals are produced from the print-media itself (and not from electronic data originating from the publication process) there is a remarkable delay in the CD-ROM production. ADONIS hopes that the turnover-time will not exceed three weeks, but we believe that five to six weeks will be a realistic figure. Libraries get orders for journal articles often before they receive the printed issue - they and their customers cannot afford further delays by waiting for the CD.

The speed of the service will be a crucial point for ADONIS in the future: when more journals will be available online via ISDN with all graphics and halftones, the relatively slow ADONIS service will certainly loose importance.

6 - Cost-effectiveness:

When subscribing to the service, an annual subscription charge of 20.000 DM is due irrespective of how often the system is used. So, in order to act economically the customer must use his system as often as possible. But then on the other hand licence fees are due for each usage. These are fixed by the publishers and may vary. By this, using ADONIS becomes a matter of arithmetics.

Furthermore, cost factors for the staff and for maintenance are to be included.

Form category 2: Electronic media based on print media but containing supplementary materials.

As an example for these “value enriched products“ I want to present the “Oxford Database of perinatal trials“[9]. The basis of this data collection is the printed book “Effective care in pregnancy and childbirth“ published

1989[10]. The chapters of this book are irregularely updated by diskettes. Wishing to fulfill orders for articles in the "Oxford database" we face difficulties: a special software is needed to search the texts on diskette and to read it and this software changes from time to time with new versions coming up. Between now and the end of 1989 five updates of the database have been published on diskettes. In fact we cannot help our customers with their orders for the "Oxford database of perinatal trials" and I wonder if any library could helped them. Libraries do not tend to buy such electronic loose leaf publications as they are extremely difficult to handle. It would be necessary to have special PC's with files for every product and you must keep the files up-to-date all the time. By that we come deeply into the conflict of the unsteadiness of electronic information: information on issue 4 of the "Oxford Database" may be partly modified or deleted on issue 5. So, we cannot guarantee to deliver the correct information. Additionally, some publishers prohibit document delivery of informations on their electronic media, or, laws prohibit such activities in general.

Form category 3: Electronic media with no relation to printed media.

Products in this category use the full potentials of electronic media like non-sequential that is associative manners of representation of the information provided.
An example is the "Compact Library AIDS" published on CD-ROM by the Medical Publishing Group of the Massachusetts Medical Society[11].

It is updated four times a year and contains

- the AIDS Knowledge database, an electronic textbook
- full texts of AIDS-related articles from important journals
- the AIDS-subset from MEDLINE with 18.000 citations
- the AIDS database from the Bureau of Tropical Hygiene and Tropical Diseases
- an AIDS treatment directory

and other full text papers and references (Fig.6).

All the information is integrated, links exist between nearly all parts of this compact library.

An ultimate product would allow hypertext connections and possess a notebook facility for own research results - but could not be handled in libraries any more.

We have not yet received orders for texts in the "Compact Library AIDS" but this is only a matter of time.

Here the limits are set again: products of this category of electronic media can hardly be used for document delivery. For the library staff it is very difficult to search for a specific document in the "Compact Library" which might exist or might be deleted with a new update and furthermore it is not possible to lend the whole CD because of licence agreements with the publisher. Such electronic media are end-user oriented and the end-user cannot be the document delivery department of a document supplier.

Summary

Libraries should in principle be open for all kind of electronically published media. There should be no restrictions in the acquisition of material even if it is published in electronic form only. The library has to provide its local customers with all facilities to use all kinds of material on site. The library itself should make more use of electronic journals and textbooks for document delivery - as far as possible.

The limits are set by the media itself: if the information is hidden or the retrieval too complicated such media seam to be dedicated for library customers as direct users only.

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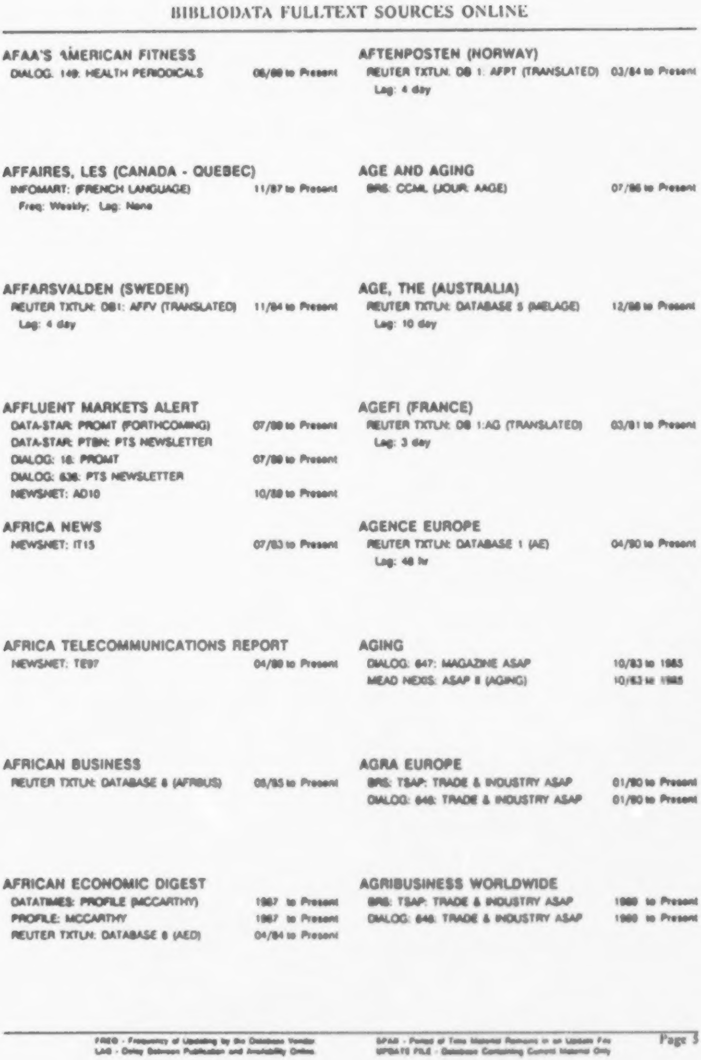
[10] Effective Care in Pregnancy and Childbirth. Ed.: Iain Chalmers. Vol. 1-2. Oxford: Oxford University Press, 1990

[11] Compact Library: AIDS. Ed.: Donald I. Abrams. Waltham, MA.: Medical Publishing Group of the Massachusetts Medical Society, 1990-



BIBLIODATA FULLTEXT SOURCES ONLINE

AFAA'S AMERICAN FITNESS
DIALOG: 149: HEALTH PERIODICALS 06/89 to Present

AFFAIRES, LES (CANADA - QUEBEC)
INFOMART: (FRENCH LANGUAGE) 11/87 to Present
Freq: Weekly; Lag: None

AFFARSVALDEN (SWEDEN)
REUTER TXTLN: DB1: AFFV (TRANSLATED) 11/84 to Present
Lag: 4 day

AFFLUENT MARKETS ALERT
DATA-STAR: PROMT (FORTHCOMING) 07/89 to Present
DATA-STAR: PTBN: PTS NEWSLETTER
DIALOG: 16: PROMT 07/89 to Present
DIALOG: 636: PTS NEWSLETTER
NEWSNET: AD10 10/89 to Present

AFRICA NEWS
NEWSNET: IT15 07/83 to Present

AFRICA TELECOMMUNICATIONS REPORT
NEWSNET: TE97 04/89 to Present

AFRICAN BUSINESS
REUTER TXTLN: DATABASE 6 (AFRBUS) 08/85 to Present

AFRICAN ECONOMIC DIGEST
DATATIMES: PROFILE (MCCARTHY) 1987 to Present
PROFILE: MCCARTHY 1987 to Present
REUTER TXTLN: DATABASE 6 (AED) 04/84 to Present

AFTENPOSTEN (NORWAY)
REUTER TXTLN: DB 1: AFPT (TRANSLATED) 03/84 to Present
Lag: 4 day

AGE AND AGING
BRS: CCML (JOUR: AAGE) 07/86 to Present

AGE, THE (AUSTRALIA)
REUTER TXTLN: DATABASE 5 (MELAGE) 12/88 to Present
Lag: 10 day

AGEFI (FRANCE)
REUTER TXTLN: DB 1:AG (TRANSLATED) 03/81 to Present
Lag: 3 day

AGENCE EUROPE
REUTER TXTLN: DATABASE 1 (AE) 04/90 to Present
Lag: 48 hr

AGING
DIALOG: 647: MAGAZINE ASAP 10/83 to 1985
MEAD NEXIS: ASAP II (AGING) 10/83 to 1985

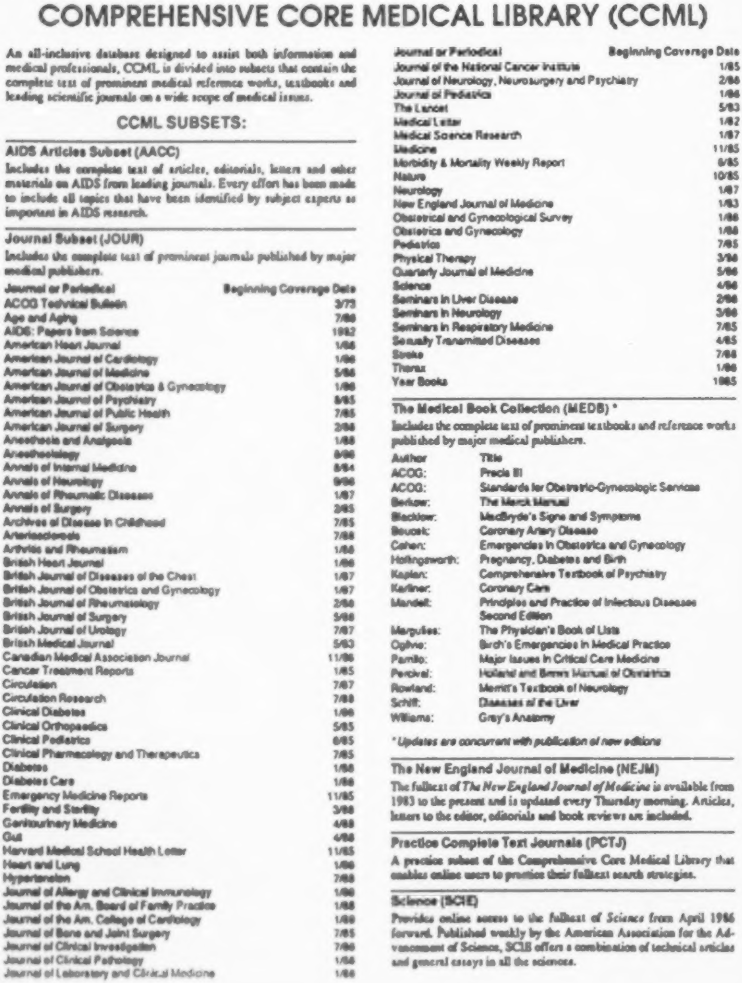
AGRA EUROPE
BRS: TSAP: TRADE & INDUSTRY ASAP 01/90 to Present
DIALOG: 648: TRADE & INDUSTRY ASAP 01/90 to Present

AGRIBUSINESS WORLDWIDE
BRS: TSAP: TRADE & INDUSTRY ASAP 1989 to Present
DIALOG: 648: TRADE & INDUSTRY ASAP 1989 to Present

FREQ - Frequency of Updating by the Database Vendor
LAG - Delay Between Publication and Availability Online
SPAN - Period of Time Material Remains in an Update File
UPDATE FILE - Database Containing Current Material Only

Page 5

Fig. 1 More than 2.400 periodicals are available online today (from[3])



COMPREHENSIVE CORE MEDICAL LIBRARY (CCML)

An all-inclusive database designed to assist both information and medical professionals, CCML is divided into subsets that contain the complete text of prominent medical reference works, textbooks and leading scientific journals on a wide scope of medical issues.

CCML SUBSETS:

AIDS Articles Subset (AACC)

Includes the complete text of articles, editorials, letters and other materials on AIDS from leading journals. Every effort has been made to include all topics that have been identified by subject experts as important in AIDS research.

Journal Subset (JOUR)

Includes the complete text of prominent journals published by major medical publishers.

Journal or Periodical	Beginning Coverage Date
ACOG Technical Bulletin	3/73
Age and Aging	7/88
AIDS: Papers from Science	1982
American Heart Journal	1/86
American Journal of Cardiology	1/86
American Journal of Medicine	5/86
American Journal of Obstetrics & Gynecology	1/86
American Journal of Psychiatry	8/85
American Journal of Public Health	7/85
American Journal of Surgery	2/86
Anesthesia and Analgesia	1/88
Anesthesiology	8/86
Annals of Internal Medicine	8/84
Annals of Neurology	9/86
Annals of Rheumatic Diseases	1/87
Annals of Surgery	2/85
Archives of Disease in Childhood	7/85
Arteriosclerosis	7/88
Arthritis and Rheumatism	1/86
British Heart Journal	1/86
British Journal of Diseases of the Chest	1/87
British Journal of Obstetrics and Gynecology	1/87
British Journal of Rheumatology	2/86
British Journal of Surgery	5/88
British Journal of Urology	7/87
British Medical Journal	5/83
Canadian Medical Association Journal	11/86
Cancer Treatment Reports	1/85
Circulation	7/87
Circulation Research	7/88
Clinical Diabetes	1/86
Clinical Orthopaedics	5/85
Clinical Pediatrics	6/85
Clinical Pharmacology and Therapeutics	7/85
Diabetes	1/86
Diabetes Care	1/86
Emergency Medicine Reports	11/85
Fertility and Sterility	3/88
Genitourinary Medicine	4/88
Gut	4/86
Harvard Medical School Health Letter	11/85
Heart and Lung	1/86
Hypertension	7/88
Journal of Allergy and Clinical Immunology	1/86
Journal of the Am. Board of Family Practice	1/88
Journal of the Am. College of Cardiology	1/86
Journal of Bone and Joint Surgery	7/85
Journal of Clinical Investigation	7/86
Journal of Clinical Pathology	1/86
Journal of Laboratory and Clinical Medicine	1/86
Journal of the National Cancer Institute	1/85
Journal of Neurology, Neurosurgery and Psychiatry	2/86
Journal of Pediatrics	1/86
The Lancet	5/83
Medical Letter	1/82
Medical Science Research	1/87
Medicine	11/85
Morbidity & Mortality Weekly Report	6/85
Nature	10/85
Neurology	1/87
New England Journal of Medicine	1/83
Obstetrical and Gynecological Survey	1/86
Obstetrics and Gynecology	1/86
Pediatrics	7/85
Physical Therapy	3/86
Quarterly Journal of Medicine	5/86
Science	4/86
Seminars in Liver Disease	2/86
Seminars in Neurology	3/86
Seminars in Respiratory Medicine	7/85
Sexually Transmitted Diseases	4/85
Stroke	7/86
Thorax	1/86
Year Books	1985

The Medical Book Collection (MEDB) *

Includes the complete text of prominent textbooks and reference works published by major medical publishers.

Author	Title
ACOG:	Precis III
ACOG:	Standards for Obstetric-Gynecologic Services
Berkow:	The Merck Manual
Blacklow:	MacBryde's Signs and Symptoms
Boucek:	Coronary Artery Disease
Cohen:	Emergencies in Obstetrics and Gynecology
Hollingsworth:	Pregnancy, Diabetes and Birth
Kaplan:	Comprehensive Textbook of Psychiatry
Karliner:	Coronary Care
Mandell:	Principles and Practice of Infectious Diseases Second Edition
Margulies:	The Physician's Book of Lists
Ogilvie:	Birch's Emergencies in Medical Practice
Parrillo:	Major Issues in Critical Care Medicine
Percival:	Holland and Brews Manual of Obstetrics
Rowland:	Merritt's Textbook of Neurology
Schiff:	Diseases of the Liver
Williams:	Grey's Anatomy

** Updates are concurrent with publication of new editions*

The New England Journal of Medicine (NEJM)

The fulltext of *The New England Journal of Medicine* is available from 1983 to the present and is updated every Thursday morning. Articles, letters to the editor, editorials and book reviews are included.

Practice Complete Text Journals (PCTJ)

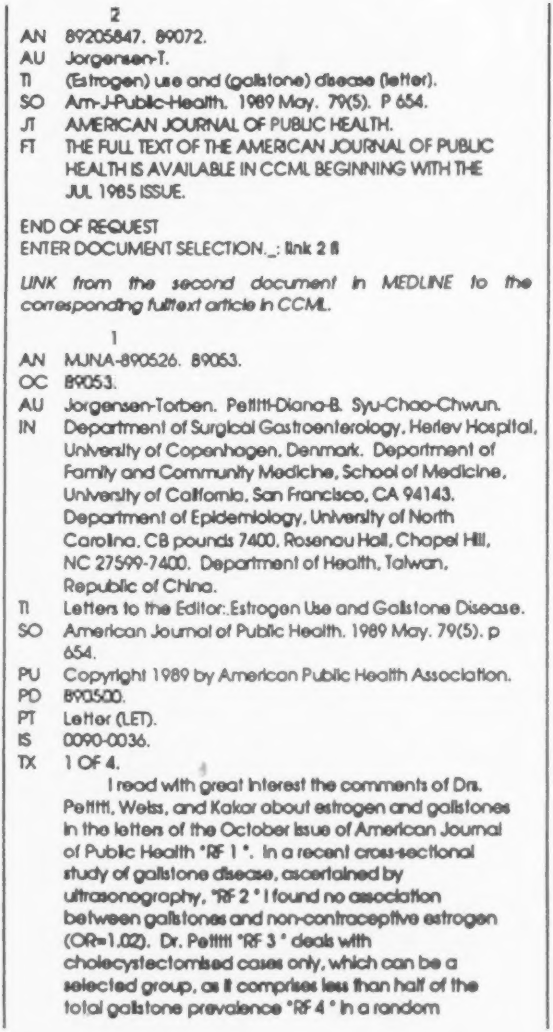
A practice subset of the Comprehensive Core Medical Library that enables online users to practice their fulltext search strategies.

Science (SCIE)

Provides online access to the fulltext of *Science* from April 1986 forward. Published weekly by the American Association for the Advancement of Science, SCIE offers a combination of technical articles and general essays in all the sciences.

Fig. 2 Online collection of biomedical journals and textbooks for the medical profession offered by BRS (from[7])

BEST COPY AVAILABLE



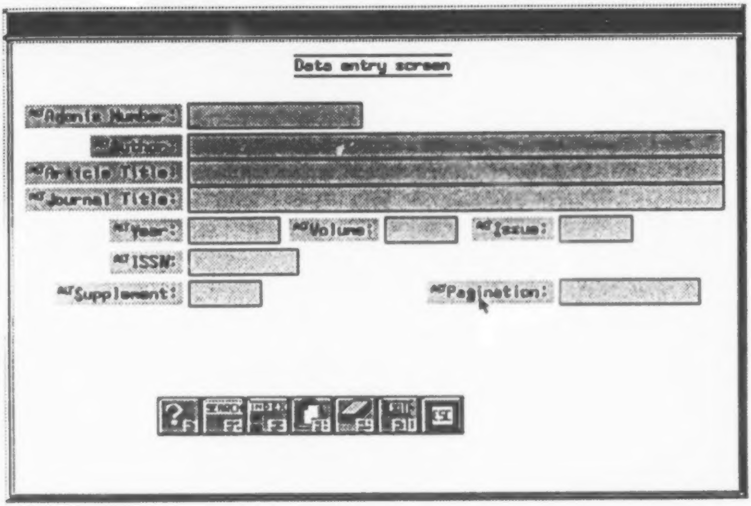
```
        2
AN   89205847. 89072.
AU   Jorgensen-T.
TI   (Estrogen) use and (gallstone) disease (letter).
SO   Am-J-Public-Health. 1989 May. 79(5). P 654.
JT   AMERICAN JOURNAL OF PUBLIC HEALTH.
FT   THE FULL TEXT OF THE AMERICAN JOURNAL OF PUBLIC
     HEALTH IS AVAILABLE IN CCML BEGINNING WITH THE
     JUL 1985 ISSUE.

END OF REQUEST
ENTER DOCUMENT SELECTION._: link 2 8

LINK from the second document in MEDLINE to the
corresponding fulltext article in CCML.

        1
AN   MJNA-890526. 89053.
OC   89053.
AU   Jorgensen-Torben. Petitti-Diana-B. Syu-Chao-Chwun.
IN   Department of Surgical Gastroenterology, Herlev Hospital,
     University of Copenhagen, Denmark. Department of
     Family and Community Medicine, School of Medicine,
     University of California, San Francisco, CA 94143.
     Department of Epidemiology, University of North
     Carolina, CB pounds 7400, Rosenau Hall, Chapel Hill,
     NC 27599-7400. Department of Health, Taiwan,
     Republic of China.
TI   Letters to the Editor:.Estrogen Use and Gallstone Disease.
SO   American Journal of Public Health. 1989 May. 79(5). p
     654.
PU   Copyright 1989 by American Public Health Association.
PD   890500.
PT   Letter (LET).
IS   0090-0036.
TX   1 OF 4.
          I read with great interest the comments of Drs.
     Petitti, Weiss, and Kakar about estrogen and gallstones
     in the letters of the October issue of American Journal
     of Public Health "RF 1 ". In a recent cross-sectional
     study of gallstone disease, ascertained by
     ultrasonography, "RF 2 " I found no association
     between gallstones and non-contraceptive estrogen
     (OR=1.02). Dr. Petitti "RF 3 " deals with
     cholecystectomised cases only, which can be a
     selected group, as it comprises less than half of the
     total gallstone prevalence "RF 4 " in a random
```

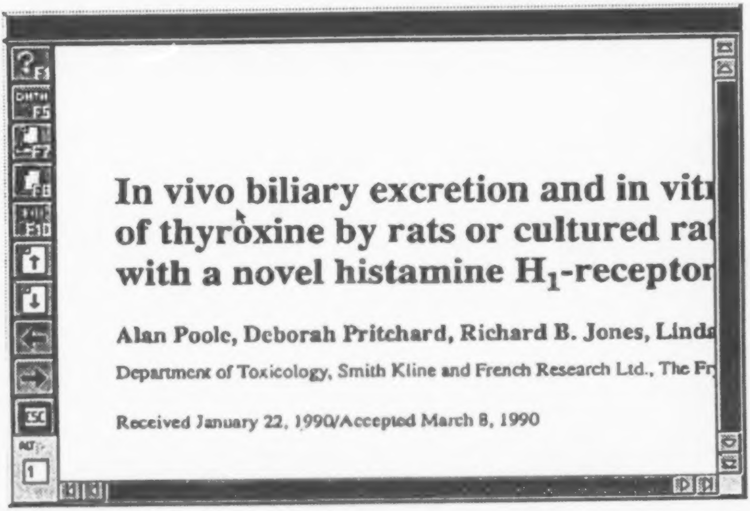
Fig. 3 Links between bibliographical (MEDLINE) and full text database (CCML): articles found in MEDLINE may be captured online (from[7])

ADONIS

- 370 biomedical journals on CD-ROM
- 10.000 pages per CD
- 45 CD per year
- Resolution of 8 x 12 mm for text pages and 12 x 12 mm for pages with halftones
- Up to 1.5 MByte per page scanned
- 20 MByte per year for the index on the hard disc
- Time lag of 3 (?) weeks in relation to the printed editions of the journals included
- Search speed: 2 Seconds (average)
- Print speed: 3.3 pages/minute (average)
- Costs:
  20.000 DM annual subscription rate plus
  Licence fees per article printed out: 5.40 DM when the printed journal is subscribed or 10.80 DM when not.

Fig. 4 Facts about the ADONIS system in operation in 1991


Data entry screen
Adonis Number:
Author:
Article Title:
Journal Title:
Year:
Volume:
Issue:
ISSN:
Supplement:
Pagination:
F1
F2
F3
F8
F9
F10
ESC


In vivo biliary excretion and in vit
of thyroxine by rats or cultured ra
with a novel histamine H_1-recepto

Alan Poole, Deborah Pritchard, Richard B. Jones, Lind

Department of Toxicology, Smith Kline and French Research Ltd., The F

Received January 22, 1990/Accepted March 8, 1990

F1
F5
F7
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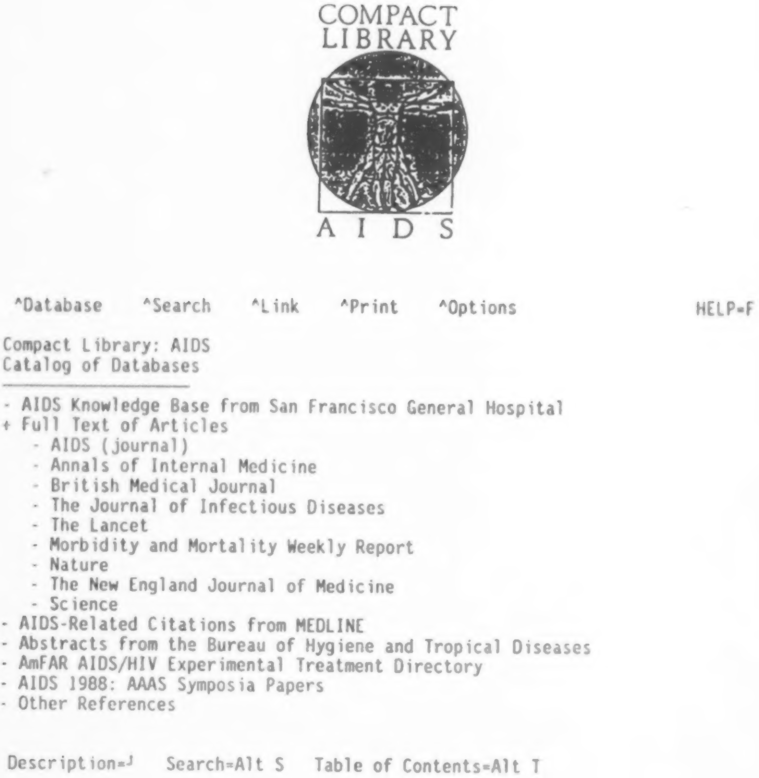
F10
ESC
1

Fig. 5 Data entry screen of ADONIS and view of a screen displaying the top left corner of the first page of an article selected



```
 ^Database    ^Search    ^Link    ^Print    ^Options                HELP=F

Compact Library: AIDS
Catalog of Databases
____________________

- AIDS Knowledge Base from San Francisco General Hospital
+ Full Text of Articles
   - AIDS (journal)
   - Annals of Internal Medicine
   - British Medical Journal
   - The Journal of Infectious Diseases
   - The Lancet
   - Morbidity and Mortality Weekly Report
   - Nature
   - The New England Journal of Medicine
   - Science
- AIDS-Related Citations from MEDLINE
- Abstracts from the Bureau of Hygiene and Tropical Diseases
- AmFAR AIDS/HIV Experimental Treatment Directory
- AIDS 1988: AAAS Symposia Papers
- Other References

 Description=┘   Search=Alt S   Table of Contents=Alt T
```

Fig. 6 Catalogue of databases in the Compact Library AIDS

55

The Global Library: The Impact of High-Speed Networks on Libraries

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The Global Library: The Impact of High-Speed Networks on Libraries

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Abstract

More than ever before, the organizational skills possessed by librarians are needed as library users reach out from their homes or offices to access not only their own library's information resources but also those located elsewhere in the world via high-speed networks. Resource directories, detailed indexes and cataloging, and customized electronic paths to these resources become increasingly important tools developed and supported by libraries using globally accepted standards. As the library without walls emerges in the consciousness of the library user, the library itself becomes a critical yet less visible provider of service. The impact of high-speed networks on the organization of libraries and their services will be the focus of this paper.

The Global Library: The Impact of High-Speed Networks on Libraries

The world is in the midst of an Information Age which is changing every aspect of our lives. Librarians are critical participants in the flow of information and will become more critical as time passes because the volume of information exceeds the individual's ability to glean pertinent subsets for their own use. Due to economic constraints, the role of the librarian in the delivery of information is evolving with emphasis being shifted from ownership of information to access to information. As players in the scholarly communications process, the librarian's role increasingly becomes the gateway between users and information. As a proactive facilitator, the librarian

- Improves access to information.
- Participates in defining the use of intellectual property.
- Develops user-friendly interfaces.
- Constructs new service definitions.
- Participates in information development.

Supercomputers and high-speed networks serve as the tools for the processing, storage, and delivery of information with librarians adding the human element.

Although the institutional library, which is defined today as a building or a group of buildings, will continue to exist as an organizational entity, the concept of the “library without walls“ or the “global library“ has emerged (Figure 1). High-speed networks and evolving access missions for libraries will enable libraries to merge into one global library collection. The institutional library will perform a gateway function to information, regardless of where the information is physically stored, for their users. As Richard Dougherty discussed earlier, this will not happen overnight. It will be expensive and will require cooperative efforts and a multitude of funding sources.

Situation Analysis

By understanding where we are headed we need to understand where we are now. The Information Age in which we now live has three elements that provide insight into the evolving global library: high-speed networks, global economics and politics, and libraries as service organizations.

A. High-Speed Networks

High-speed networks are available today in the several national and regional networks that together form the Internet. In the United States, the Internet is considered to be the precursor to the National Research and Education Network (NREN). Internet's predecessors were developed originally to support scientific and defense research and rapidly expanded to the general academic community. Due to the ever increasing levels of network traffic and the need to accommodate complex graphics, video and audio data, networks are continually being upgraded to higher speeds and load capacities.

These high-speed networks provide access to a wealth of resources supporting education and research. These resources include raw data files, analyzed data, electronically stored text, bibliographic databases, plus computer processing to compile data. In addition, the Internet provides electronic conferencing capabilities for the open and dynamic exchange of ideas which is so critical to the scholarly process. However, as the Internet exists today several opportunities which could improve usage of electronic information resources present themselves. The most difficult aspect the Internet user finds today is the lack of access tools to available resources. While there is a wealth of available information the average user does not know where it is or how to locate it. There needs to be a systematic and easy to use means of identifying relevant information. Standards for naming conventions such as file names and user names are needed to help the user in the location process. The average user also needs to have formalized training and user documentation made available to him or her. And finally, user friendly interfaces are needed which would reduce the complexity and the training needs for the end user.

The potential of high-speed networking is enormous. The universal availability of high-speed networking means that electronic information can be delivered instantly, eliminating geographic and physical access constraints. Electronic networking facilitates and accelerates idea and information exchange through conferencing thus speeding up the research process.

Although costly itself, networking has the potential of reducing the expense of information management of electronic publications. It should be noted that printed information will continue to exist for a long time to come. Access to centrally stored electronic data files eliminates the need for redundant local storage saving on physical space requirements (buildings) and labor involved in circulating, storing, and preserving printed material. Publishing electronically preserves natural resources by reducing unnecessary printing of information for mass distribution on the assumption that someone, someday will need the information locally. Finally, centralized storage of electronic data files reduces labor in the production, handling and delivery of a physical product, thus hopefully reducing the cost of the output. Productivity gains will also be realized with the existence of high-speed networks. Availability of electronic information through high-speed networks eliminates delays in the access and delivery of ongoing research results by accelerating the publishing process. For the researcher and the information specialist (librarian), the number of mechanical steps in the research process are reduced by the networked access to information sources and requesting systems. Finally, productivity is already being realized due to the easy and immediate informal exchange of ideas critical to the creative process through electronic conferencing.

In order to make high-speed networks work for the researcher and student, several requirements for success are needed of the global library. The sophisticated organizational skills of librarians are needed to catalog and index resources on the networks. Librarians understand how researchers work and can provide invaluable expertise in the creation of friendly, yet flexible, user interfaces. As information proliferates, researchers increasingly need customized and automated paths their own areas of study. Librarians again are in a position to best be able to work with research and expert systems to create such customized information paths for their clientele. Librarians need to be heavily involved in the re-evaluation of rights to and ownership of intellectual property so that systems can accommodate those rights while still providing access to electronic information. Librarians understand that information comes in many types of packaging and that the variety of information formats is growing. Libraries are already able to handle information published and produced in a variety of formats; adding electronic information to the list has already started to happen. However, we need to convince others that because the information is not physically in the library building that we still play a critical role in disseminating that information. A final success requirement is the acceptance by faculty and administrators of electronic publication as a valid criteria for the academic reward system. Without faculty acceptance of electronic publications, there will be a reluctance to publish in this manner. The costs of the printed research results and the excessive delay in the current scholarly communications system are costing our governments and university too much in all types of resources. A new model is needed that implies a need for different academic reward criteria.

B. Global Economies and Changing Political Environments

In the past two years we have seen dramatic world events happening around us. The electronic media is able to provide instantaneously information about world events. This instantaneous information supply is changing user expectations and needs in many ways. Not only do our library users expect to be able to turn on the television for up-to-the-minute information, they also expect it of their libraries. Libraries are also effected by the changing political boundaries and international relations which are encouraging free and more open exchange of information. Parts of the world that previously did not have open access to information are hungry for it and, conversely, other countries are hungry for information from these newly opened countries. Suddenly we have an urgency of information needs facing us all.

Meanwhile, global economics are taking their toll. Serial prices continue to sky-rocket and labor costs have also been increasing at a steady rate. Libraries no longer have the buying power they once had. Meanwhile, the library users are demanding more information and more service.

When examining the scholarly communications process, of which libraries are a part, the main catalyst behind the changes we are seeing is the concern for the high cost of serials. Commercial publishers are viewed as charging far more for their publications than society or academic publishers. Some people have expressed concern that the price of information has no relationship to the value or use of the information; for instance, a journal may be cited or indexed very seldom and yet cost hundreds if not thousands of dollars each year. Another concern regarding the costs of information is that much of the research has been funded by the government and the institution thereby making it public information; however, the libraries are then expected to purchase the published results.

Meanwhile the publication process is far to slow, especially in the science and medical fields, to accommodate research needs. The peer review process is now under scrutiny to see if the process can be accelerated.

The issue of quality versus quantity in the existing publish or perish tenure process plays a role in this discussion. The explosion of published research has contributed to the increased cost and quantity of information as faculty vie for long lists of publications to become tenured. How much is the quality of an individual's output being examined?

Issues have been raised regarding intellectual property as well. In the United States, the copyright is transferred from the author to the publisher at the time the work is published. Academic and research institutions loose ownership of the results of their work. Some people dislike this situation, but at least it works for printed (or otherwise physically produced) publications. However, for electronically published information there is no mechanism in place to protect the copyright, regardless of who owns it, in the current electronic networks. Information can be transferred and edited without any tracking mechanism thus allowing for copyright violation. As we address the rights of intellectual property in a networked environment, we will be taking on the whole issue of copyright[1].

C. Changing Academic Libraries

Traditionally the academic library's mission was to acquire, store, and loan material to scholars. This mission implied that the user needed to come to the library to locate and use materials. The library frequently focused its service on providing bibliographic access to owned materials and less on the information itself. Academic libraries are in a transition phase today, moving from ownership to information access. Bibliographic access is now viewed more as a tool with the primary focus on the information itself.

These three elements in the current situation analysis reflect a world that has greater expectations due to technological advances. Librarians realize that they need to evolve with the times to continue to provide a real service for which they are uniquely qualified.

Accommodating Chance

As we look for solutions to all of these issues, the answers inevitably point to electronic storage and delivery of information as part of the solution. We need to look beyond the traditional ways of publishing and delivering information, specifically to automated systems, electronic storage and retrieval, and high-speed networks. What is needed are systems that control the peer review process, respect intellectual property, allow for centralized storage, and distribute information electronically. In conjunction with those systems, academic and research institutions should take responsibility for publishing the intellectual output for their own institutions. By abandoning the concept of published titles/issues, a convention that works for printed materials, and moving towards article level electronic publishing and delivery through high-speed networks, we open our minds to new approaches to information packaging and delivery.

A model for a new Scholarly Communications System was proposed by Sharon Rogers and Charlene Hunt in the Chronicle of Higher Education, October 18, 1989. In their model (Figure 2), the Scholarly Communications System would allow the author to put an article intended for publication in the system for a brief period of time when anyone could comment on the contents and research methods in a notes field only. At the end of the review period, the author could revise the article and submit it for peer review by a pre-determined board of reviewers. The board would categorize the article so that the accepted article would be retrievable in ways that are currently not possible (i.e. original contribution to literature in a field, application of a theoretical perspective or method, etc.). Once accepted for publication, the article would be generally available with usage statistics and citations being tracked for use in the tenure process. Royalty payments would be made whenever the article was printed out on the system. The Scholarly Communications System itself would be funded by grants and fees from founding institutions and annual fees would be charged to institutions using the system.[2]

To take the Scholarly Communications System a step further, librarians from the author's institution should take responsibility for the cataloging and indexing of the article. Once the document is catalogued and indexed in the system, no one else would need to perform these functions. These retrieval tools for a published article should be made immediately available when the article attains published status. As part of the development of the Scholarly Communications System, librarians should take a leadership role in the development of standard thesauri for global controlled vocabulary so that retrieval anywhere on the network would be possible. Once the thesauri have been established, there needs to be an ongoing commitment to the updating of the thesauri thereafter to maintain currency.

The library should also serve as a gateway to information published both in the Scholarly Communications System and elsewhere. Already we are seeing document delivery systems being introduced. In a world where electronic information is available through networks, the researcher's request would go through the library system which would search for the electronically stored information or for the bibliographic citation of non-electronically stored information. Non-electronic information would have electronic requests sent out to owning libraries for delivery through the mails or by fax. Electronic information would be requested from the central repository and distributed through the networks directly to the requestor's computer or fax machine or to the library if the requestor does not have receiving facilities available. Usage and accounting statistics would be maintained by the library's system and/or by the Scholarly Communications System. Libraries would pay for the use of electronic information in one of three models: per use, by annual subscription for unlimited access to a publisher or institution's output, or through reciprocal resource sharing agreements.

In addition to the need to automate the scholarly communications process, other technological evolution will effect the way libraries operate in the future. As mentioned earlier, the high-speed networks will continually be upgraded to handle increased traffic at higher transmission speeds. A variety of data types will need to be accommodated in the future including but not limited to high-resolution graphics, audio, and video data. As it stands today, Internet is a composite of regional networks that link to local networks. Any link in this chain can be older technology that may not accommodate all types of data being transmitted.

As the technology evolves so should standards for that technology. Standards need to be applied in all areas and significant progress has already been made in some areas. As mentioned above, hardware and networking standards need to be applied so that data can be transmitted freely throughout the global network. Standards also need to be applied to areas such as user interfaces and communications. A relatively new standard for library automation networking, NISO Z39.50, when fully implemented would allow users to search other library catalogs using the search protocols for their own library. This is essential as many libraries are already allowing access to any library catalog on the Internet from their library terminals. For instance, at Tufts University we have incorporated into our own custom-designed library menu system an

Internet share-ware menu developed by Mark Resmer at Sonoma State University in California. The Sonoma State software (Figures 3-7) allows for easy access to library catalogs worldwide by first presenting regions of the world on menus, gradually narrowing it down to the specific catalogs. Once a library catalog is selected, instructions, as provided to by the library, on how to use the catalog are displayed and the user is asked if he or she would like to be connected to the catalog. If the user responds with a 'yes', the system automatically makes the Internet connection eliminating the need for the user to know TELNET protocols and Internet addresses. However, this is just a first step in the process of providing broader access to the 'global library'. Although access is readily available, the library user must know which library catalog would be the most appropriate to search for the material desired and must deal with the fact that each catalog has different logon and search procedures. If a library with a relevant collection is not known, the process could take quite a while and prove quite frustrating to the user. The next step to improving service is to implement the Z39.50 standard which would standardize the search process for the user. Once the standard is implemented, new systems need to be designed that automatically perform the user's search through library catalogs until a result is achieved. Using expert systems, the order in which library catalogs are searched would vary depending on the subject of the search or the user performing the search.

Other standards have been or are being implemented and need to evolve. Currently, almost all libraries use the MARC bibliographic format to create their catalog. The newer MARC Holdings format has yet to be implemented in most library automation systems and would open up the door for greatly improved resource sharing and automated document delivery systems. Once bibliographic and holdings data is encoded, the transfer of this data between systems is greatly simplified. Libraries and their materials vendors are beginning to implement the Electronic Data Interchange (EDI) standards for the transmission of business transactions such as purchase orders, invoices and payment. This type of data transmission could be applied in the future to usage fees where appropriate.

Librarians need to work with their automation vendors to accommodate the needs of the global library. All library systems were designed with the idea of ownership in mind. As external access becomes a requirement, these systems need to evolve to provide user-friendly access to resources beyond the library's bibliographic database. Already a number of systems provide journal citation modules which allow for the search protocols of the online catalog to be used against journal index databases. Usually items are noted in some fashion if the library owns the journal title cited. However, they cannot yet tell if the issue in which the article was published is owned by the library adding steps to the research process. With the ability to mount journal index databases, library system vendors have already started to allow for multiple database capabilities. These capabilities need to go beyond bibliographic database to include full-text, images, graphics, audio, video, etc. A few library system vendors have started implementing the Z39.50 standard to provide uniform searching protocols for library users. All library catalogs need this capability so it is imperative that libraries communicate this as a high priority. Because libraries are opening up access beyond their own walls, it is also critical that library system vendors support a wide variety of terminal access and provide sophisticated security systems to enable a diverse user population to access the databases. Finally, library system vendors need to continually be aware of how to improve the user interfaces of their systems to make them as friendly as possible. This not only includes the screen layouts and command structures but also the log on and off routines for a variety of access points.

Librarians have traditionally played the role of preserver of information and this role will not diminish. The permanency of electronic information seems more fragile and librarians need to take an active role in establishing procedures and policies regarding the permanent archiving of electronic information files. Technological obsolescence must be accounted for in this process. Massive storage will be required which leads to policies on whether information should be centrally or locally stored. Storage costs are as real as building costs.

Finally as expert systems and hypertext applications are developed, librarians will play a critical role in creating customized navigation tools for their clientele. User interfaces and paths should be easy to use with a minimum of instruction. Navigation paths need the capability of being easily changed as a person's research interests and needs evolve over time. Librarians are far better equipped to develop these types of user aids that other professionals due to our understanding of how people use information and how information needs to be organized.

Future Global Libraries

Libraries need to evolve with the technology by which information is made available. As a starting point, the library mission needs to connect the scholar to information in diverse locations and published in diverse formats. This does not mean that information published in traditional paper distribution methods will disappear. Instead, it means that new formats will increasingly be a factor in the delivery of information. The library without walls (Figure 8) means that the library user may in fact rarely, if ever, visit the library building and still receive excellent if not improved service. Libraries need to shift away from the emphasis on the bibliographic access process, which remains a vital step in the research process, and move toward emphasis on immediate information delivery as the primary goal. In essence, this means that the bibliographic access process will become an invisible or less visible step to the user. We have to keep in mind that what the user wants is the information not a time-consuming process to get it. Finally, the organizational structure of libraries will shift to accommodate new services. Like the phone companies with automated calling and banks with their automated teller machines, library staff may have less direct personal contact with the user as more of the traditional services are automated for instant delivery and new services are provided.

Libraries will offer new services and, in the transition, will eliminate some traditional services. We can expect that libraries will provide new finding tools such as network directories, increased and improved indexing, and personalized informatics systems which navigate the user through the network. As the gateway service to external resources, the library will provide access to information regardless of its physical location. Using expert systems, librarians will create knowledge processing and packaging systems to assist the researcher through the enormous world of information. Librarians will also provide information management instruction which extends the traditional bibliographic instruction to areas of how to organize ones own personalized information library. Document delivery will become more automated by linking library systems which identify relevant citations to electronically stored versions of the document for either file transfer or automated faxing of the document. In order to improve accuracy and to speed up the acquisitions process, librarians are already beginning to implement EDI transmission of business transactions. This capability will open doors to improving the administrative support in many other areas as charges for networking services will need to be handled. Finally, librarians will be very involved in the preservation of electronic information insuring its availability to future generations.

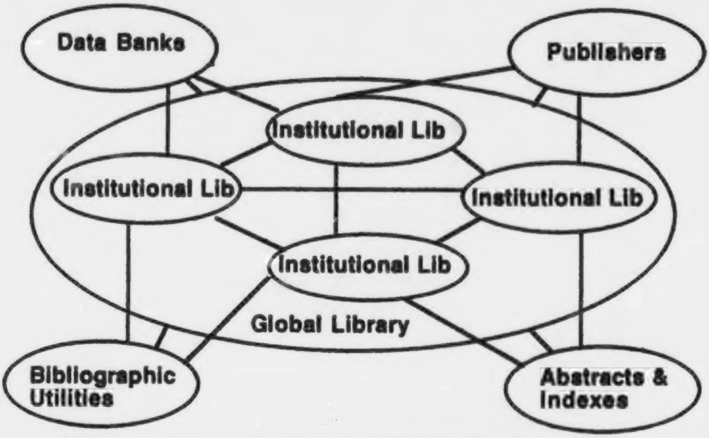
Conclusion

Information is flooding our lives. Librarians are uniquely qualified to organize and process the information into meaningful packages for the busy researcher. A combination of automated systems, high-speed networks, and personal service will produce a powerful combination of information delivery by libraries. Along with their parent institutions, libraries will be working to have better control of scholarly communications to control costs, increase scholarly productivity, and to provide quality delivery of information in a timely manner. This will not happen quickly and nor without expense and effort.

References

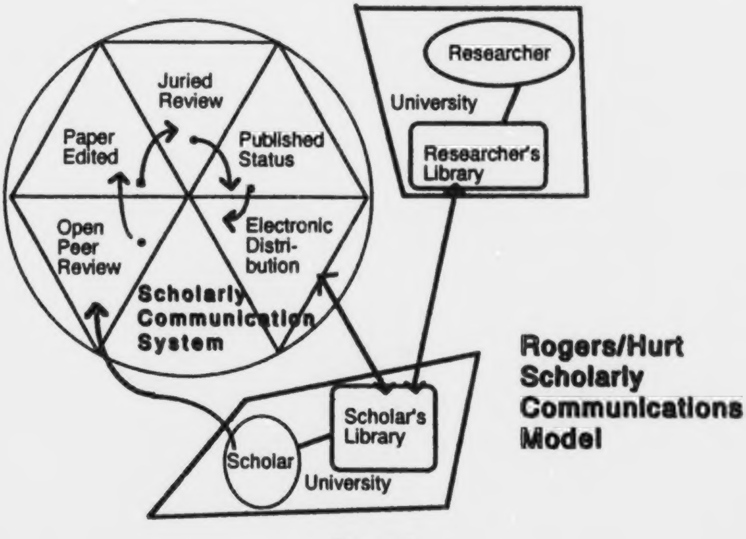
[1] Ann Okerson, "With Feathers: Effects of Copyright and Ownership on Scholarly Publishing," College and Research Libraries (September 1991): 425-38.

[2] Sharon Rogers and Charlene S. Hurt, "How Scholarly Communication Should Work in the 21st Century," Chronicle of Higher Education (18 October 1989): A56.


Data Banks
Publishers
Institutional Lib
Institutional Lib
Institutional Lib
Institutional Lib
Global Library
Bibliographic Utilities
Abstracts & Indexes

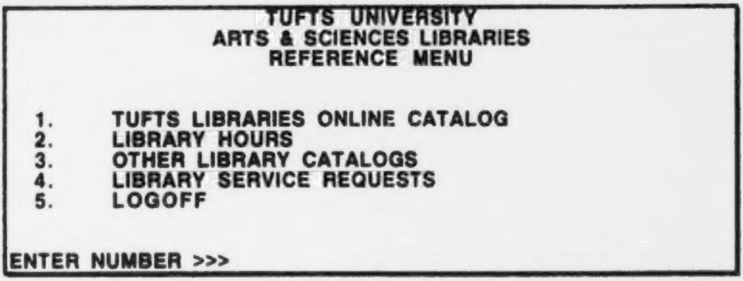
Future Library Networks

Figure 1


Researcher
University
Researcher's Library
Juried Review
Paper Edited
Published Status
Open Peer Review
Electronic Distribution
Scholarly Communication System
Scholar's Library
Scholar
University

Rogers/Hurt Scholarly Communications Model

Figure 2

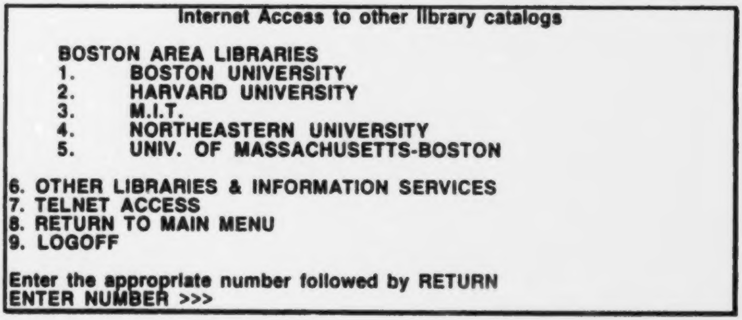


```
                    TUFTS UNIVERSITY
              ARTS & SCIENCES LIBRARIES
                    REFERENCE MENU


     1.      TUFTS LIBRARIES ONLINE CATALOG
     2.      LIBRARY HOURS
     3.      OTHER LIBRARY CATALOGS
     4.      LIBRARY SERVICE REQUESTS
     5.      LOGOFF

ENTER NUMBER >>>
```

Figure 3



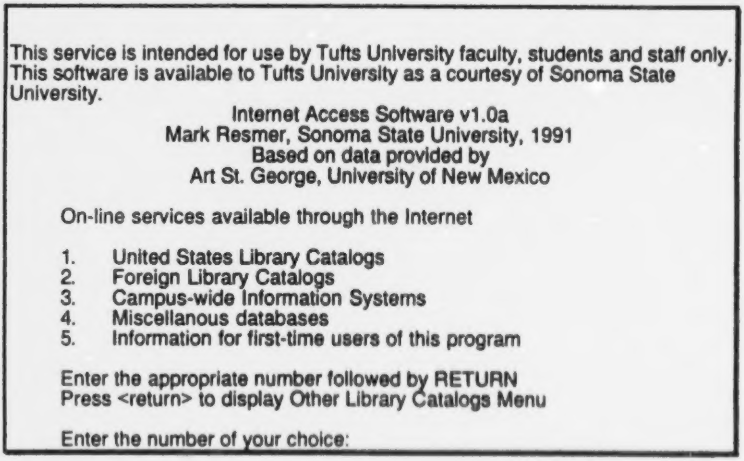
```
              Internet Access to other library catalogs

       BOSTON AREA LIBRARIES
        1.       BOSTON UNIVERSITY
        2.       HARVARD UNIVERSITY
        3.       M.I.T.
        4.       NORTHEASTERN UNIVERSITY
        5.       UNIV. OF MASSACHUSETTS-BOSTON

6. OTHER LIBRARIES & INFORMATION SERVICES
7. TELNET ACCESS
8. RETURN TO MAIN MENU
9. LOGOFF

Enter the appropriate number followed by RETURN
ENTER NUMBER >>>
```

Figure 4



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This service is intended for use by Tufts University faculty, students and staff only.
This software is available to Tufts University as a courtesy of Sonoma State
University.
                         Internet Access Software v1.0a
                  Mark Resmer, Sonoma State University, 1991
                            Based on data provided by
                   Art St. George, University of New Mexico

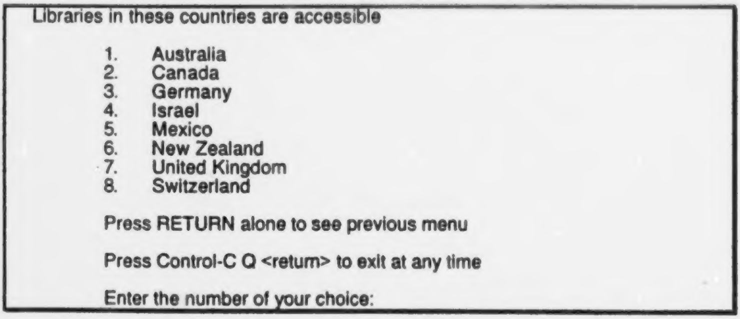
    On-line services available through the Internet

    1.    United States Library Catalogs
    2.    Foreign Library Catalogs
    3.    Campus-wide Information Systems
    4.    Miscellanous databases
    5.    Information for first-time users of this program

    Enter the appropriate number followed by RETURN
    Press <return> to display Other Library Catalogs Menu

    Enter the number of your choice:
```

Figure 5



```
  Libraries in these countries are accessible

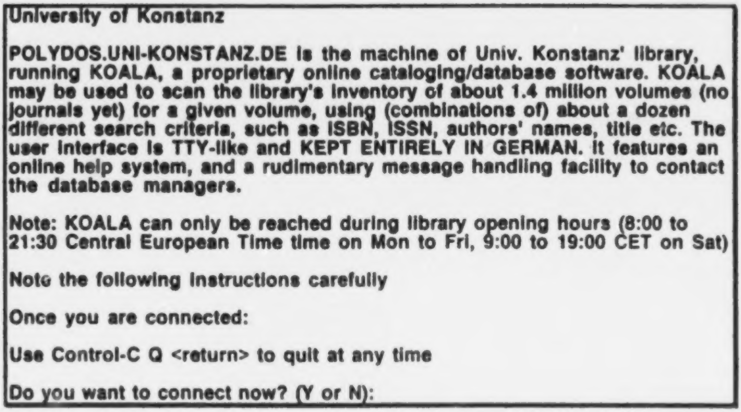
         1.    Australia
         2.    Canada
         3.    Germany
         4.    Israel
         5.    Mexico
         6.    New Zealand
         7.    United Kingdom
         8.    Switzerland

         Press RETURN alone to see previous menu

         Press Control-C Q <return> to exit at any time

         Enter the number of your choice:
```

Figure 6



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University of Konstanz

POLYDOS.UNI-KONSTANZ.DE is the machine of Univ. Konstanz' library,
running KOALA, a proprietary online cataloging/database software. KOALA
may be used to scan the library's inventory of about 1.4 million volumes (no
journals yet) for a given volume, using (combinations of) about a dozen
different search criteria, such as ISBN, ISSN, authors' names, title etc. The
user interface is TTY-like and KEPT ENTIRELY IN GERMAN. It features an
online help system, and a rudimentary message handling facility to contact
the database managers.

Note: KOALA can only be reached during library opening hours (8:00 to
21:30 Central European Time time on Mon to Fri, 9:00 to 19:00 CET on Sat)

Note the following instructions carefully

Once you are connected:

Use Control-C Q <return> to quit at any time

Do you want to connect now? (Y or N):
```

Figure 7

GLOBAL LIBRARY

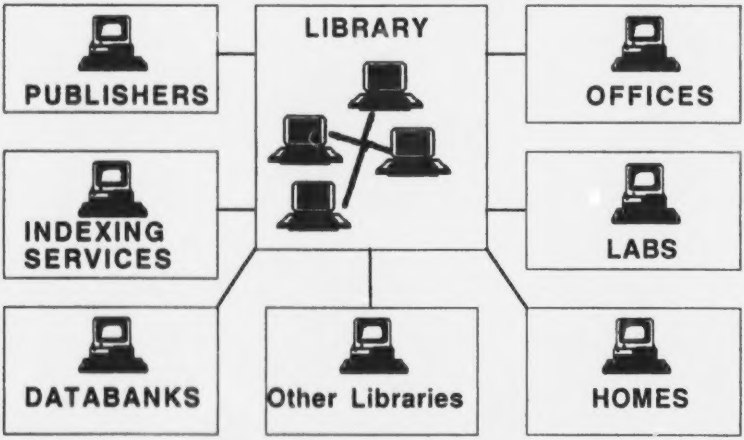

Figure 8

BEST COPY AVAILABLE

Integrated CD-ROM-Retrieval in Networks: How to Automate the Post-Processing of Downloaded Export Files

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Integrated CD-ROM-Retrieval in Networks: How to Automate the Post-Processing of Downloaded Export Files

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Abstract

Offering CD-ROM-databases in networks is becoming a normal service to users of German libraries. But data retrieval in an integrated network environment should not stop after leaving the retrieval program - therefore the downloaded data are the object of this lecture.

Different fields of post-processing are discussed, i.e. printing and storing on floppies, manipulating the data for individual requirements by means of word-processing software and concepts and solutions for central conversion of the different formats to a unique standardized format, thus allowing to transfer the data to library catalogues.

However, the automation has to fit into the special security requirements of a network and a high degree of flexibility is necessary to manage the different tasks.

Integrated CD-ROM-Retrieval in Networks: How to Automate the Post-Processing of Downloaded Export Files

0. Introduction

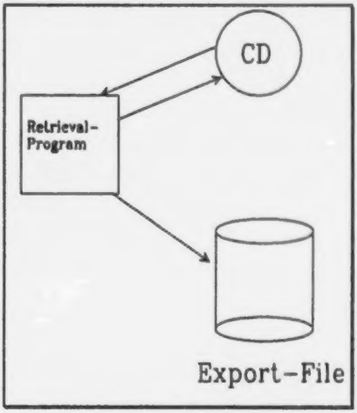
CD-ROM-retrieval offers access to read-only data on a CD. Most retrieval programs have a so-called export-function, which allows the downloading of retrieved data to export files.

With bibliographic databases on CD-ROM the idea of exporting titels and transfering them to host-databases becomes very interesting. It offers the downloading of export files to students and the educational staff of a university.

In a CD-ROM-network the complexity of "downloading export files" allows several interesting solutions, some of which will be discussed in the following lecture.

1. Basics of export file generation

The basic idea is very simple: the data are retrieved on a CD-ROM by using the necessary retrieval program, marking the titles and exporting them to a file or directing them to a printer.



Some very important questions come up:

In which format will the data be presented?

Which field names will be defined?

Are there any control-characters inside the file?

How is the process of exporting going on?

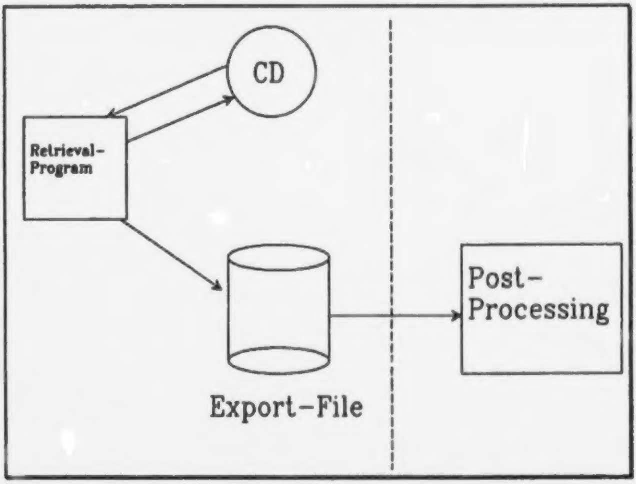
Is the file name of the export file predefined or does it have to be entered?

Can the format be changed or predefined?

Is it possible to define user-specific formats?

Is it possible to predefine an export-path, i.e. where will the downloaded export file be stored?

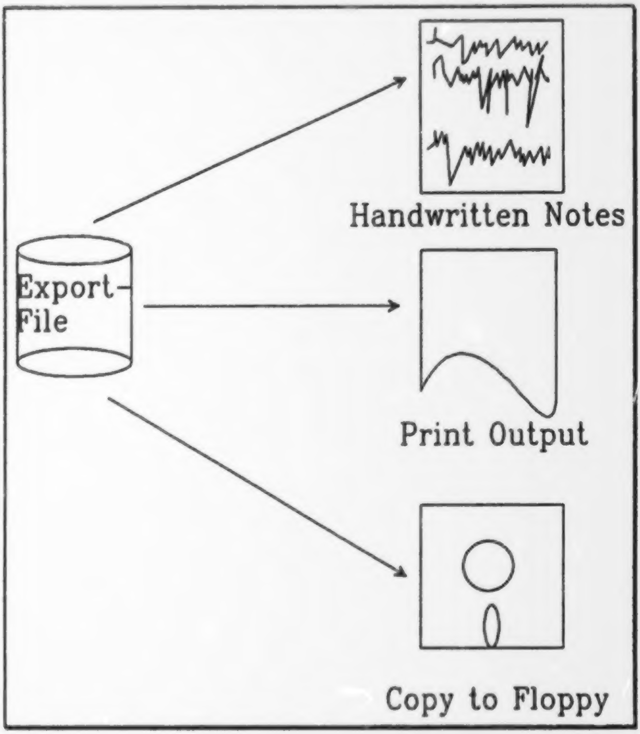
All these questions can only be answered in relation to the retrieval-software used. There are many different ways offered by the various programs and in the end, the user of a CD-ROM-network has to learn and understand several different end-user interfaces.



Once the export file has been stored on a harddisk, the publisher-dependent area of CD-ROM-retrieval is left. Exporting and post-processing of CD-ROM-data is therefore a process of changing read-only data into variable data.

2. Output of export files

The first and basic possibility of post-processing is the mere output of CD-ROM-data.


Export-File
Handwritten Notes
Print Output
Copy to Floppy

Handwritten notes are possible without any additional hardware.

The print output can be directed to a printer. This printer can be directly connected to the PC; it can be a network printer or a printer connected to a master print station.

Copying data to the floppy is interesting for users with their own computer equipment. Copying is possible to the local floppy drive or a drive of a master copy station.

Transfer of export files to hosts is another possibility.

However, some points require further discussion:

What impact does copying to local floppy-drives have on network security?

What happens if dozens of users are able to print across the network?

What will be the cost of paper and floppies?

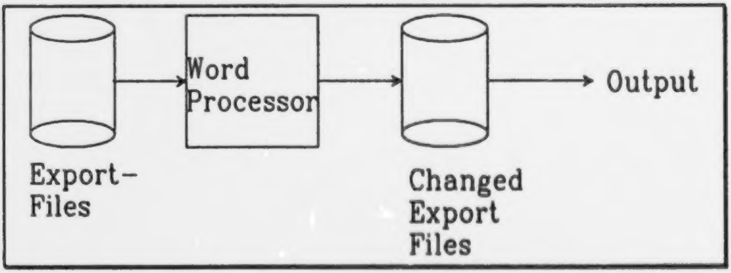
Can or should the user be charged?

Are there any limitations for print or copy output?

We will find a lot of answers to these questions and in the end we will find, that the "normal" way of exporting known from a local PC has to be changed dramatically inside a network environment.

3. Word-processing of export files

It seems very sensible to offer a possibility of post-processing the exported data before doing the output on a printer or floppy. Editing data with a word-processing software is a very good idea.



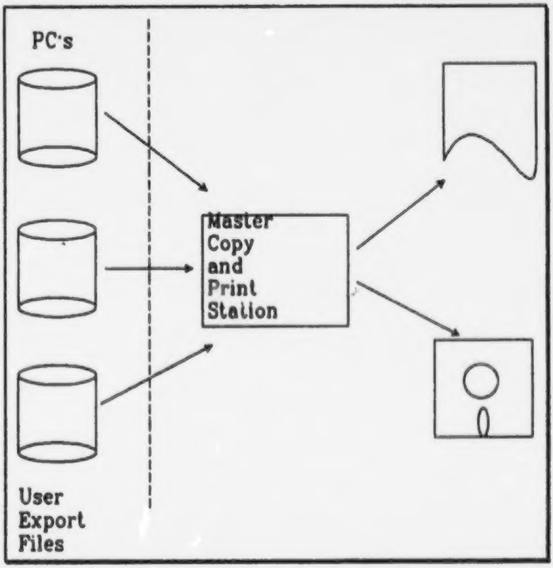
But the standard word-processing programs will bring up new problems:

Most of them have a DOS-Exit which is very dangerous for network-security. They allow the loading of other files, in addition to the export file. The users can therefore manipulate other files. In general, the standard text processing software suffers from a feature overkill; 90 percent of the functions are not necessary for post-processing export files.

For this reason only a restricted software should be used. This software should be configurable to meet the needs in a CD-ROM-network.

4. Master print and copy station

Uncontrolled printing and copying in a network environment cannot be accepted. A master copy and print station could be a viable solution.



The user cannot directly print out or copy his files, but is forced to first send them to the master station after he has finished work. Then he leaves his PC, goes to the master station and there he will copy his files onto a floppy or print them on a printer directly connected to that master station.

This function forces the user to limit his selection of data to be printed or copied. In many cases the user will find this way too complicated, if he only wants to print out a few titles and will therefore prefer writing them down manually - which is very sensible in the view of the library administration.

Further questions are arising:

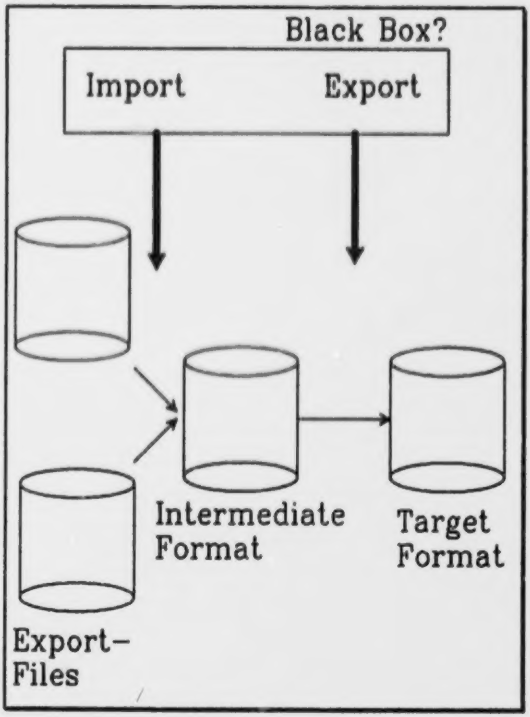
Should the master PC be a self-service-station or should access to it be controlled by an employee?

How can the user be charged, e. g. by adding a plastic card reader to the master PC?

Is it sensible to build in a file size restriction, i.e. a function which only allows those files to be printed or copied, which do not exceed a certain amount of bytes?

5. Conversion of export files

Titles exported from CD-ROM may have many different formats. Automatic post-processing is only usefull if data are available in a general standard format. To reach this conversion, routines have to be integrated into the whole process.


Black Box?
Import
Export
Intermediate Format
Target Format
Export-Files

Conversion should always be designed as a two-step process: the import of an export file into an intermediate format and the export of that intermediate format to the target format. Once you have defined the export of the target format, you only have to define the import-conversion for the different CD-ROM-export files.

Different conversion systems are available on the market, but there are some important differences:

Is the conversion system a black-box system, i.e. is it completely driven by non-menu-parameters?

Is it a semi-automatic program which requires a user-reaction to trigger the next step?

We have tested the ALLEGRO-conversion program and found it a viable way to integrate the conversion very comfortably. But - similar to all conversion routines - the definition of import and export-tables is very complicated and requires special knowledge.

6. Post-processing of converted export files

It does not matter which of the ideas presented here you prefer. In any case you have to combine different end-user interfaces into one overall system, which should give you the impression of a continous stream-processing.

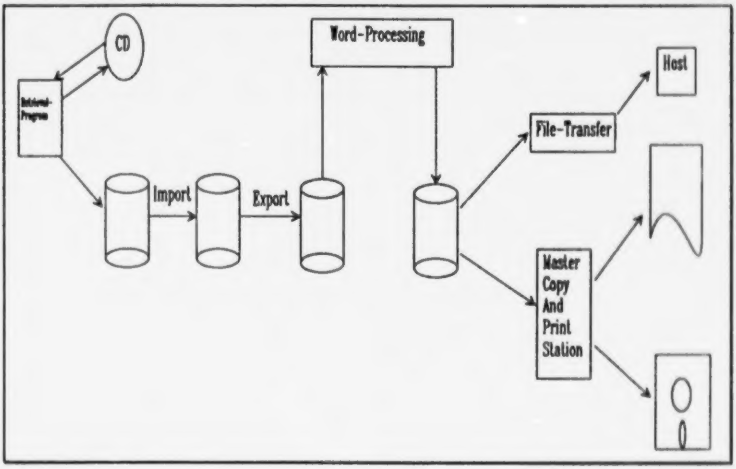
The degree of automation depends on the possibilities of configuration offered by the different programs.

Within the retrieval programs there is little influence, but after the data have been exported, it is up to the system supervisor to design a consistent end-user interface.

The basic tool will be menu systems, which respect the export files. Once they are downloaded, they must not disappear into the dark underground of a harddisk, but should be presented and shown inside the menu-system.

All additional tools like word-processing software, conversion routines, file-transfer programs etc. should be selected with respect of their ability to fit into the whole system.

Finally, I would like to give an example and a general overview of how post-processing of export files can be automated.


CD
Word-Processing
Host
File-Transfer
Import
Export
Master Copy And Print Station

Identification of Electronic Documents: The Diversification of Document Supply and its Consequences for Document Description

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Abstract

Much effort was necessary to come to an agreement on national and international standards for bibliographic description of printed journal papers. Electronic Publishing will complicate this situation. Not only are there different descriptions of a single physical document, but also different physical supply forms of the master document - no matter whether it is printed or electronic. The possibility to generate documents which have little or no reference to the concept of printed documents complicates the situation even more.

There are several solutions for identifying printed documents or electronic versions of those documents by special numbers like the ADONIS-reference-number or Biblid. In case these identification numbers are not used there is another solution left: a matching code. This, however requires standards for bibliographic description, too. But no agreement exists on the description of electronic documents, especially for those, which are published with little or no relation to the print concept. ISO 10956, which is available as Committee Draft (CD), seems a possible perspective but in spite of the diversification of document supply forms little explication is given in this CD as to the system requirements for using the documents. Solutions to this problem are set forth by the author.

Identification of Electronic Documents: The Diversification of Document Supply and its Consequences for Document Description

0. Introduction

Ladies and Gentlemen,

most of you have a lot of experience in the delivery of documents printed on paper. As a condition of successful document delivery it is essential to give a specific bibliographic description for the identification of the ordered item. It took several hundred years to elaborate adequate rules for the problem of identification and description of printed material and there are still some problems left because the shape and the design of publications is still subject to change.

The standards which have been developed like RAK, the "Regeln für die alphabetische Katalogisierung", AACR2, the "Anglo American Cataloguing Rules 2" following the ISBD(G), the "General International Standard Bibliographic Description" offer different solutions to the problem of bibliographic description. Nevertheless, there has been little concern about the proliferation of "Non-Book Materials" (NBM). Especially the increasing variations and amount of electronic publications will make solutions necessary that offer assistance to those who have to handle electronic documents whether they are scientists who use them or librarians and information specialists who want to prepare them for usage.

My paper analyzes this developing situation and offers proposals for the description and identification of electronic publications. My main thesis is that electronic publications challenge the limits of the traditional bibliographic description of documents. This is because electronic publishing will make different types of documents possible. Such documents cannot be described only by traditional bibliographic means. To manage this problem we will have to go beyond the traditional bibliographic view. This will facilitate different kinds of document supply made possible by those different types of documents.

By searching for such solutions my point of view has been a user oriented one. My proposals focus on the needs of users and pay less attention to sophisticated cataloguing. Clients' needs should and do have priority. In other words, “standards must reflect the real world of applications beyond libraries and publishing“ (Brownrigg/Butler 1990:23).

Let me give you an overview of the points I want to cover:

1. I will describe the changing types of documents made possible by electronic publishing.
2. I will give an overview of existing ways to identify documents by special document identifiers or matching codes. Their usefulness will be reported and their application to electronic publications will be described.
3. There will be a close look at the description and identification of electronic documents offered by ISO 10956.

1. Types of documents - their diversification as a consequence of electronic publishing

In the print-on-paper world we have the following situation (see figure 1):

Authors elaborate ideas and findings which are published as documents. That means the original data is represented in a document (e.g. a journal article or the published version of a paper). Several printed issues might exist even of one paper. Furthermore, every issue might be described according to several different bibliographic rules and their variants.

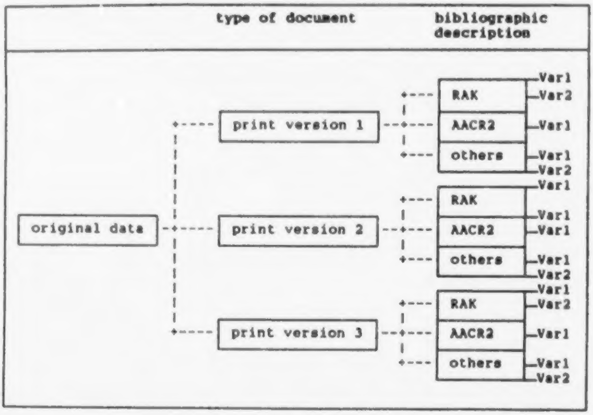
type of document
bibliographic description
original data
print version 1
print version 2
print version 3
RAK
AACR2
others
Var1
Var2

Figure 1: Types of documents and their different bibliographic descriptions

Electronic publishing complicates this situation by offering - at least - three additional types of documents which have implications in document description and identification. They are

a) electronic parallel publications,
b) publications which are related to the print-on-paper concept,
c) publications with little or no relation to that concept.

Let me give you some explanations to these types of documents[1]:

Electronic parallel publications:

Most of the electronic publications which are available are parallel publications. A lot of them are 1:1 duplicates, which means they have also been published on paper, either as a book, a newspaper or some other kind of publication or parts thereof. Their bibliographic description seems to be no real problem as only the specifications of the electronic type of supply have to be added. But there is no standard for the bibliographic description and ordering of that kind of documents even though there are explanations and recommendations in reference to NBM.

Publications which are related to the print-on-paper concept:

Electronic newsletters, bulletin boards and other kinds of electronic publications[2] still have some relation to the print-on-paper concept. However, under normal circumstances there is no real equivalent in paper-based form. Some of these publications are dynamic documents, which means the computer environment allows to modify existing parts of the document or add new ones.

Existing NBM-rules are simply inadequate for giving a correct "bibliographic" description of these dynamic documents because these rules do not require data about the system requirements for the use of electronic documents.

Publications with little or no relation to the print-on-paper concepts:

The slowly but steadily increasing amount of publications based on the hyper-concept calls for the description, identification and supply even of those documents. Because their characteristics allow different views on the knowledge basis or the document derived from it there is a need for referencing those views. Additionally, there are some other unsolved issues like the adequate description of the compression ratio of pictures or audio-sequences.

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[1] See for more details about those types of documents Osswald 1991

[2] Whether the term "publication" is justified for this kind of material or not should be discussed in another paper.

To summarize:

In my opinion we have no adequate solution yet to the problem of bibliographic description of electronic publications or parts thereof. Nevertheless the user has somehow to order and get them. Additionally, the user and we as information specialists are supposed to preserve the integrity of the intellectual process. Therefore we as information specialists need to create the conditions for the possibility of clear and unequivocal references to these electronic resources.

So what we are really talking about is the unequivocal identification of electronic publications. This, in turn, depends on the power of special document identifiers.

2. Document identifiers

Performing a document order requires not only receiving the right data in the right sequence and with the right punctuation but also implies the need to solve the logical ambiguities typically contained in the clients' order. Doing this electronically is the most rigorous way of solving this problem. There are two different methods of identifying documents electronically:

a) The creation of a special document identifier like the **ADONIS-reference number** or **BIBLID** (the ISO standard 9115 for "Bibliographic identification of contributions in serials and books") followed by a matching process with an index of identifiers representing documents of a stock;

b) a **matching process** between the (bibliographic) document description and the data of the document order or between parts of both.

The concept of the **ADONIS-reference number** has been well explained in several papers by members of the ADONIS-staff (Stern/Campbell 1988, Stern/Compier 1990). Therefore I don't need to explain the way it is constituted. But the combined code of the ADONIS-reference number created for the electronic parallel publications gathered on the ADONIS disks only applies to a small sample of journal articles. That may be the reason for the fact that - as mentioned by Mr. Korwitz - only one commercial online database (EMBASE) refers to this code, severely restricting the usefulness of this code.

BIBLID is based on a similar concept but is created out of other elements of a document description. It is available as an ISO standard, for books as Book-Biblid and for serials as Serials-Biblid. Publishers are supposed to create the code in reference to the ISO standard and print it on the top of an article or a contribution to a serial publication. The problem of this visually readable code is that - until now - it has not been accepted by publishers. As a consequence BIBLID has not been able to be applied for searches in online databases and therefore it is still no real and practical help for document identification and ordering.

Both the ADONIS-reference number and BIBLID are created out of traditional bibliographic data and rely on the print-on-paper concept. They are approaching their conceptual limits when used for documents which have little or no relation to this concept.

Recently[3] there has been the suggestion of a concept without any relation to the print-on-paper concept, i.e. a transfer of the ISBN-system to electronic information products[4]. If such a system were to be accepted in the same way the ISBN-system[5] was accepted in the print sector this would be a great step toward the identification of electronic documents.

The **second concept** of identifying documents also uses data contained in bibliographic document descriptions. It can be applied to every kind of data. The basic concept is to compare (string by string) the (bibliographic) data of the document description with data of the document order. Automating this process is only possible if an electronic version both of the (bibliographic) document description and of the (bibliographic) data of the order exists.

Most of the existing matching codes for duplicate checking offered by online hosts are based on this concept. Their usefulness and precision differ widely.

The most sophisticated one seems to me the **USBC**, the **"Universal Standard Bibliographic Code"**, which was created during the DOC-MATCH projects and tested by the project QUARTET in an ADONIS test bed (Ayres et al. 1990, Yannakoudakis/Ridley 1989). It is constituted of four elements:

> "The first is a letter representing the year of publication. The second element is six characters long representing the least frequently occurring characters in the author's name. The third element is taken from the pagination using the last two digits of the page on which the article starts. The fourth element is seven characters long representing the least frequently occurring characters in the title. Any blank spaces are filled with stars." (Yannakoudakis/Ridley 1989:4)

Depending on the quality of the data of document orders the USBC can be qualified to different levels of exactness.

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[3] See Password 1991.

[4] There are plans for the further development of the ECHO-database DIANEGUIDE to a product called I'M-GUIDE. The directory covers not only databases and databanks, but also CD-ROM and CD-I products, diskette bases, image banks etc.

[5] It is reported that 75% of the American and 60% of the European publishers apply the ISBN-system (Password 1991:8).

Like other codes USBC refers to the concept of traditional bibliographic description of documents. But the problem we have to face by the increase of electronic documents is that we don't know how those documents can and should be described. Consequently there is no agreement on the data which might be used for document identification regardless of whether the identification should be processed automatically or intellectually.

3. Bibliographic references to electronic documents or parts thereof

As explained electronic documents have several specifications in both form and content which originate in the computer environment in which they are created, maintained, and disseminated. As ISO 10956 explains in its introduction: "Although an electronic document may stylistically resemble a print publication, such as a monograph, a serial, or an article or chapter, the physical characteristics inherent in printed publications do not always apply to electronic forms." (ISO 10956:Introduction) To create an adequate description of the electronic material we need to reflect on their special identity which means to "understand not only their physical characteristics ..., but also the type and amount of information that the user will need to identify the material." (Rogers 1982:23)

To give assistance to this process there has been a Working Item (WI) added as Number 117 to the programme of work of the TC (Technical Committee) 46[6] of the ISO. Since 1986 it has been developed by a working group of subcommittee (SC) 9 which concentrates on the "Presentation, identification and description of documents". It is now under study as ISO Standard 10956 Committee Draft (CD). As this document is still subject to change my citations and comments have a preliminary status.

To quote from the chapter "Scope" of ISO 10956 the standard "is intended for use by authors and editors in the compilation of references for inclusion in a bibliography, and in the formulation of citations ... . It does not apply to full bibliographic descriptions as required by librarians." ... "It sets out a prescribed order for the elements of the reference and establishes conventions for the transcription and presentation of information derived from the source document." (ISO/CD 10956:1)

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[6] ISO/TC 46 Information and Documentation defines its tasks and working scope like this: Standardization of practices relating to libraries, documentation and information centre, indexing and abstracting services, archives, and information science and publishing.

As long as no other agreement on bibliographic references of electronic documents exists we should use this chance offered by the (draft) standard to gather experience with the practicability of its rules. Using the standard citation of electronic documents might offer additional possibilities of creating automatically processed document ordering.

The concept of ISO 10956 is very similar to other rules for the bibliographic description of documents like e.g. the AACR2 rules for non-book material. Nevertheless, it tries to keep in mind the special identity of electronic documents.

It is not the purpose of my paper to explain the standard in detail but I want to explain the basic concept and the essential problem which arises out of this concept for the description of electronic documents.

As in other bibliographic rules the data for the description derives from the item itself. This approach seems to me a real problem as - in most times - the users' needs regarding the item go beyond that information.

If we look at the conditions (e.g. the hardware and software requirements) under which programmes or electronic publications are used you can imagine how important the information about "system requirements" is.

Like the "Note Area" given by AACR2 for non-book material, e.g. machine-readable data files, the standard associates essential information about the system requirements to an optional field under the label "Notes".

This association has its origin in the basic concept of "autopsy" which means the use only of data which can be taken out of the source itself[7]. From this point of view data for system requirements doesn't exist or seems to have a marginal status but in reality it is essential. An example given in the standard may explain this inadequate situation:

> "Books in print plus: the complete Books in print system on campact laser disk database on CD-ROM. 5th ed. New York: Bowker Electronic Publishing, Jan. 1990- . Updated quarterly. 2

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[7] See for example RAK and RAK-WB § 115.

> computer disks: colour, $5^{1}/_{4}$ in. or $3^{1}/_{2}$ in.; 1 compact disk. Accompanied by: 1 manual. (Books in print plus series). *System requirements: IBM PC, XT, AT, PS/2 or full compatible; 640 K memory; DOS 3.1 or higher; hard disk recommended or 2 $5^{1}/_{4}$ in or $3^{1}/_{2}$ in. floppy drives; monochrome or colour display; compatible MS-DOS Extensions device driver required; CD-ROM players supported include Amdek Laserdrive 1000, Hitachi 1502 or 1503 or 2500 or 3500, Philips LMSi 100 or 110 or 121 or 131 or 201 or 210 or 212." (ISO/CD 10956:18)*

To know what kind of system requirements exist to read and use an electronic publication is not only an essential point for the user but also for all those who are concerned with document delivery. Therefore it is not acceptable that information about the system requirements is called "optional". According to the ISO-standard there are only some specifications as to which components of a hard- and software configuration are to be described. The supplementary field "Information concerning system requirements" is only explanatory. These explanations should "include the specific make and model of computer on which the program is designed to run; the amount of memory required; the name of the operating system and its version; the software requirements; and the kind and characteristics of any required or recommended peripherals. ... To reduce ambiguity, it is suggested that the words 'System requirements:' or an equivalent precede this information." (ISO/CD 10956:10)

There is only a small chance for a librarian or other staff of a document supply centre to get all the relevant data of the technical environment necessary to use the electronic publication. Such information can "only be achieved with the cooperation of those who produce, store and distribute computerized information" (Dodd 1982:48). To reach that objective we have two possibilities:

a) The system requirements may be added to the source itself which may thus follow the concept of "autopsy". But there is catch: Reading about those "system requirements" presumes that the work, which remains to be done, has already been done. The data has been read in a computer environment and essential system requirements have been fulfilled.

b) Information about the system requirements should be added on obligatory accompanying material or on an additional label accompanying the storage medium.

The system requirements themselves can be shortened by creating macro descriptions for typical configurations of hard- and software. Such configurations might be agreed on by publishers, user groups and - very essential- by the information industry. But until now no such initiative has been forthcoming. Even the MAJOUR SGML-document type definition for article headers which has been developed by the European Workgroup on SGML (EWS 1991) doesn't offer a solution to the problem yet. Perhaps the conciousness of the problem will increase in the next years as electronic publications seek more importance on the information market. In my opinion the time to think about it has come.

Ladies and gentlemen, thank you for your attention.

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Full Text Imperatives for the National Library of Scotland

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Full Text Imperatives for the National Library of Scotland

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Abstract

The cost of housing and distributing information for National Libraries in Britain increases in real terms with every passing year. At the same time, National Libraries in Britain and elsewhere are under increasing pressures to reduce their costs and to provide access to their valuable collections to a greater proportion of the populations they serve. This paper examines some fundamental problems facing these libraries and illustrates why and how large-scale document imaging can solve this problem in an affordable manner.

Full Text Imperatives for the National Library of Scotland

It is always a great delight to come to Essen to attend this popular and well run conference. Though I am sad Dr Helal is not able to be with us this year, he can relax; his conference is in good hands.

The last time I attended the Essen Symposium was 5 years ago. Then, OSI was on the agenda. Many promises were given about what we could expect from OSI. It was going to revolutionise record sharing. The reality is different as now we know.[1] Agreement on standards has involved long, hard work. Only very recently have search and retrieve standards been concluded and these involve such complex implementations that for the future only the larger cooperative systems will be able to make use of them.

However, I have not come here this year to discuss the failure of OSI. I mention the subject only to illustrate the potential problems ahead when we attempt to establish electronic publishing standards. If OSI was difficult, electronic publishing will be yet more so.

Following the excellent papers that have gone before, my paper will be one of light relief to you. I want to discuss an associated activity to that of electronic publishing. My viewpoint will be that of a national library charged with the brief to hold and make available all the information we keep in trust for our nation, and that will include information in electronic form before too long. The ideas expressed in this paper are those of the author and are not the policy of the National Library of Scotland.

Many of you will be aware of a recent craze called bungy jumping. It is active here in Essen. The participant climbs a tower to a platform some 60 metres above the ground and then hurls himself, head first, off the platform and to the ground below. His protection is an elastic rope attached to one of his ankles. My paper contains ideas such that their presentation to you today is the equivalent of intellectual bungy jumping - but without the elastic.

I want to discuss a new challenge facing us. Five years ago I was accused of encouraging libraries to go backwards when I proposed my European central database scheme. I suspect, this time, I will be accused of trying to push libraries forwards too quickly. However, even to begin to accept my thesis you will have to throw away certain ideas you have nurtured since the cradle. Some might call my ideas unreasonable but I am reminded of and comforted by the quotation by George Bernard Shaw. He said,

> "The reasonable man adapts himself to the world: the unreasonable persists in trying to adapt the world to himself. Therefore, all progress depends on the unreasonable man."

BACKGROUND

Before presenting my paper I would like to provide you with some background information I believe will be essential if a proper understanding of my argument is to be gained. First, my suggestions apply primarily to national, copyright libraries and not to all libraries. Second, it must be understood that national libraries are not self-renewing libraries of fixed size like most libraries. Because they never discard books and other printed information, they continually grow. Third, because I am much more familiar with the situation as it applies to the National Library of Scotland (NLS), I will tend to refer to the NLS for costing and sizing information. However, my remarks should have wider applicability.

National libraries naturally are very important. They reflect the cultural development of a nation and as such tend to be housed in large, imposing, buildings, often located in prime sites in the centres of capital cities. As a result they are costly to build as well as to maintain. The new British Library will have cost more than £400 million when it is completed in 1996 but will be full before the year 2000. The NLS is on a much more modest scale but it too will shortly have spent £40 million for a new, additional building that, if current accession rates are maintained, will be full in another twenty years time. The NLS' existing buildings have been and will be retained of course and these require considerable maintenance. For example, to rewire and to fit an up-to-date sprinkler system in just one of our older buildings is costing us over £5 million. Other general maintenance such as heating, cooling, lighting, cleaning and decorating, costs many £ millions each year. In addition we require a large staff to service the needs of our readers.

Collections in national libraries tend to be of closed access because space is at such a premium. This allows us to shelve our books by size rather than in any logical manner. This and the compact shelving we use, means that browsing by the public is just not possible. Instead, we employ special staff to find required books and to bring them to readers.

For example, if a reader wants to read one of our books he must come to the Library in person. Then he must consult our catalogue to see whether or not we have the book. The catalogue will tell him where that book is shelved, if we do have it. Information from the catalogue has to be transcribed onto a borrower's slip that the reader hands in to the Issue Desk and from where it eventually finds its way to one of our Book-Fetchers.

The very size of the collections of national libraries usually results in these collections being housed in different buildings all over a city or country. So, whenever a book housed in a distant building is required by a reader in the central building, considerable staff resources are needed to locate the book and then to carry it to the reader. When the book has been read, the same effort, in reverse, is required to replace it on the shelves. The handling and inadvertent mistreatment popular books have to endure often results in them requiring, early in their lives, the expensive attentions of the Preservation and Conservation Department. In addition, just like the well known and never ending, task of painting the Forth Rail Bridge, books in very large collections require a small team, working endlessly, just to keep them free from dust. In short, even disregarding the more technical/bibliographic operations involved in the maintenance of a large research collection, simply looking after the physical needs of such a collection is a very expensive undertaking.

As I have already mentioned, the big problem with national libraries is that they just keep growing. University, college and public libraries are self-renewing libraries. That is, once they have reached their agreed maximum size, for every book added to the collection, another book already in the collection has to be discarded. There is no such rule for national libraries, and nor should there be if they are to build the sorts of collections their readers require. Though not the largest of the national libraries, the National Library of Scotland still adds more than 3.5 miles (5.6 Km) of new shelving to its stacks every year. Similar stories can be told for most other national libraries. In her paper entitled "Storing the world's information - a 21st century crisis", Marilyn Sharrow of the University of California told the 1991 IFLA conference that three North American libraries, by no means the largest, between them require the equivalent of 5 miles of new shelving each year. She wonders where we will find room for all the shelving we will require in the 21st century.[2] If the task of maintaining our collections is expensive today, and we continue as at present, just think what the costs will be in another 50 years time.

Another problem with our present system is that, though it is very expensive to operate, national libraries can only serve the needs of relatively few people. We are limited by the number of reader places we have available at any one time. Readers in national libraries tend to arrive first thing in the morning and stay until closing time. They soon occupy the places we have available for them, after which time we have to turn away late arrivals. Also, all readers have to travel, sometimes thousands of miles, to consult books in a national library. While it would be possible to send books to readers, the cost, the delays, and the dangers through loss and damage are such that national libraries tend to restrict consultation to their own premises. Clearly a far less satisfactory system than the cost justifies.

An added difficulty is that, in Great Britain, we have 5 copyright deposit libraries; the British Library, the National Library of Wales, Oxford and Cambridge University Libraries and of course, the National Library of Scotland. The cost of supporting these ever expanding libraries is considerable and I fear we will all soon be forced by our paymaster, the British Government, to reduce the level of our individual acquisitions. Such a move could seriously and permanently damage the usefulness of our collections to our readers. If we do nothing but hope for the best, my fear is that the National Library of Scotland might eventually be allowed only to collect material of a purely Scottish nature. This would turn that very fine research library into something no more than a Scottish folk library. I recently returned from a touring holiday around Scotland, which I can recommend to you all. I travelled 2,100 miles, all north of Edinburgh and that did not include visits to the hundreds of islands we have. There is a lot of Scotland north of Edinburgh but the population tends to be widely dispersed. It is difficult and expensive for many Scots to visit their national library. If they had to travel a further 400 miles to London whenever they had need to access a comprehensive research collection, they would find it a considerable disincentive. It is up to us to show that a continuous, upwardly spiralling level of cost, is not an inevitable result of providing comprehensive access to the printed word at a local level. This is the imperative facing us. In summary, the present system is -

- very expensive to operate
- certain to become yet more expensive in the future
- clumsy, time-consuming and labour intensive
- ineffective in that only a small number can use it

* one which discourages inter-library lending
* one that will not be allowed to continue for much longer.

Patricia Donlon of the National Library of Ireland recently reminded us[3] that Sir Frank Francis, the first chief executive of the British Library, way back in 1958 said "I wish I could point to instances in Europe where a great national library, with the burden of the past lying heavily on its shoulders, had adjusted itself to modern conditions." A decade later he commented, "Excessive interest in the past has sometimes been an inhibiting factor in the true appreciation by librarians of the nature of their job. Indeed, I am certain that many of the great libraries of the world have been so turned in on themselves and so devoted to the past that they have been tardy in appreciating what was required of them and slow to model their policies on up-to-date ideas." If it was true then how much more true is it today when technology provides dramatically new opportunities and challenges every year?

I hope to prove to you today, based on some of the new opportunities recently made available to us, that a realistic, affordable, long-term alternative to our present system can be found[4, 5].

Potential Savings

The introduction of the dramatically different, image-based system, I will come to shortly, is certain to cost a considerable sum of money, and we can only, realistically, expect funding for such a system if we can clearly prove, taking into account my previous remarks, that over the longer term, the new system is one the British Government can afford. Let us examine areas of potential saving.

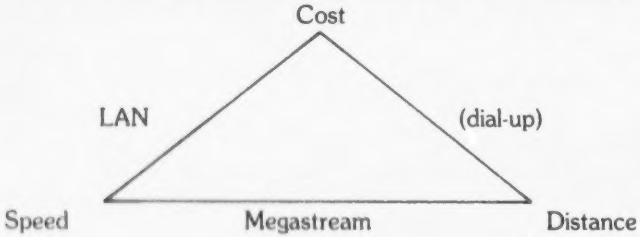
First, there is the cost of new buildings. Currently, in the NLS, we spend between £1 million and £2 million each year (on average) constructing new buildings to house our ever expanding collections. If we could identify a different system that did not require additional buildings, we immediately could make a potential saving of between £1 million - £2 million per annum as a contribution towards the cost of our new system.

Next, once constructed, our buildings must be maintained, heated and illuminated. They also must be serviced by security staff and cleaning staff. The total for these two aspects alone could easily amount to £0.5 million per annum. Let us also assume the printed material will not be retained after it has been converted into images. Users will be able to identify and access the material they require without the intervention of a member of library staff. Consequently, considerable long-term savings will be achieved through a gradual reduction in the numbers of service-related staff required. There will also be huge savings resulting from the reduced need to house books in a physical form. In addition, the number of readers who will be able to make use of the new system will increase substantially. Not to have to travel to the books and documents they require will be a considerable advantage to them. The savings in time and money to individuals will be very large and might be a legitimate excuse for making a small charge whenever our material is accessed outside the library building itself. We will require fewer security guards, fewer cleaners, fewer book-fetchers and fewer conservation staff. Indeed, since part of the process of scanning could include some OCR/ICR of title and contents pages, even the role of the cataloguer might change as might the number required. Substantial staff savings amounting to well over £1 million per annum would eventually be made. In total, a potential £2.5 - £3 million per annum could be released for use by the new system in just the National Library of Scotland. Most importantly, costs, at long last, will be contained while services will be extended and improved.

It is important to be aware of these huge, potential, but none-the-less real, savings that the introduction of the right system could effect. Let us now look at the size and shape of this new system as well as how images could be manipulated and presented.

The Presentation Problem

There is a design principle called “Truemans Triangle“ that places the three major criteria involved in the design of a communications system, namely cost, speed and distance at the three corners of a triangle.



Truemans Triangle

The idea behind this placement is to indicate their conflicting relationships. In other words, we can achieve two of the above criteria but always at the expense of the third. For example:

- An inexpensive, long-distance link will not be fast (An example would be Dial-up)
- A fast, long-distance link will be expensive (Leased lines/ megastream)
- A fast, inexpensive link will not support long distances (LAN)

One problem we face is that images tend to be large data objects. For example, even with monochrome images, an A4 page, scanned at 200 dpi produces about 0.5 MBytes of data. Grey scale or colour requires yet more bits to represent each pixel and produces much more data for the same scanning resolution. Images of many megabytes are common.

At present we can transfer A4 compressed images on a fairly quiet LAN in about one second. A large, uncompressed coloured image on a busy system could take minutes. A standard 9600 baud line is totally unsuitable for the transmission of images. We require at least Kilostream and preferably Megastream to transfer images over long distances. Thus, the cost of the communications' element is high in an imaging system. However, such a high speed system is available in the UK in the form of JANET, the Joint Academic NETwork and ISDN. Similar services exist in other European countries. In the U.K. much higher speeds are on the drawing board under the name of Super JANET. Speeds of 100 Megabits per second have been discussed. This development is independent of any particular imaging project but the coincidence of the two must be regarded as fortunate.

Large format, high definition screens will be required to display our images. A recent report from Frost and Sullivan, the international market research publisher, estimates that demand for high definition, graphics workstations is set to exceed $15 billion by 1994. By 1999 the same report predicts such workstation sales to exceed $33.7 billion. The good news for us is that these screens, which now are so expensive, will fall rapidly in price as large numbers are sold. The necessary communications infrastructure to allow our imaging system to operate successfully over a distance and the coming availability of cheap, high definition displays are two important factors contributing to the feasibility of the total system. What about the central database we will generate? Will we be able to store it and maintain it?

The Storage Problem

For simplicity, let us consider just the printed monograph collection of the NLS. This comprises some 5 million volumes, each containing approximately 300 pages. About 1% of these pages will be in colour. Using Group IV fax compression, about 30,000 characters would be required to hold the image of an A4 monochrome page. Since the average size of a monograph is nearer A5, let us allocate 20,000 characters for each page. Five million monographs, each of 300 pages yields 1.5 billion pages (the American billion!). Multiplying this by 20,000 gives 30 terabytes. A coloured page will require 1 megabyte per page to store. Fifteen million pages will generate another 15 terabytes, giving a grand total of 45 terabytes. Clearly this is a huge quantity of data. Two years ago it would have been impossible to manage such a database but times have changed.

Many companies have entered the optical imaging market, seeing there an opportunity for big returns. Some of these companies have specialised in providing storage solutions for the vast quantities of data that will be required. At the time of writing this paper, one of the largest systems comprises a juke box about the size of a large desk with eight or more read heads and containing 2280 x 5.25" optical discs of mixed or the same technology. A single juke box can hold 2 terabytes of data and is available now. The cost of this system is not small but by comparison with the building costs I mentioned earlier, the cost of £100,000 per juke box is not unreasonable. A sum of £2 million would probably buy 25 juke boxes giving the 50 terabytes capacity needed to cover the storage requirements for a collection of 5 million monographs. Next year it is certain that these capacities will be expanded dramatically while the size and cost of the boxes is sure to reduce. Storing the huge quantities of data a fully imaged library will require, quite simply, is no longer a problem.

Access to the data in a fully imaged library would be through a series of powerful servers using a modern relational DBMS. We would also need to use X-terminals or PCs with at least 386 processors, super VGA screens and about 4 MB of memory. Screen filling can be time-consuming when using simple RS232 connections. To provide the high communications speeds needed for this type of system, devices would be connected to the database using a local area network with a megastream connection for remote terminals. Again, all the above requirements are available now.

So, storing, manipulating, distributing and displaying our full-screen book images present no problems that, even today, cannot easily be overcome. However, there is one problem that will cause significant difficulties. I refer, of course, to the problem of converting our individual pages into digital images.

The Scanning Problem

The task of scanning large quantities of data can be handled in one of two ways but in either case, I believe, this is one difficulty that will never go away. Significant improvements have been made in scanning technology including intelligent character recognition (ICR), the ability to scan both sides of a sheet simultaneously and the ability to handle different paper thicknesses at high speed. More improvements will certainly follow. Already it is possible to scan A4 pages at a continuous rate of one page per second. Higher and more accurate scanning speeds will soon be available as will high speed colour scanning, but none of these improvements address the one, fundamental problem facing librarians. How do we scan bound volumes at high speed without irreversibly damaging those volumes?

Let us look at the numbers.

We agreed earlier that, for a collection of 5 million volumes, we need to store the images of 1.5 billion pages. Assuming we scan at one page per second and we work 8 hours a day for 250 days each year, we could scan in 7.2 million pages in one year. One person would require 208 years to scan 1.5 billion pages. Twenty-one scanning workstations could do the job in 10 years. We will require a further 5 stations to handle the new material received during that period. Speeds of one page per second are only achievable, and will only ever be achievable in the future, if we allow automatic sheet feeding of our book pages. Let no-one have any doubts about what I am saying. I maintain, because the technology will never be able to scan bound volumes at an acceptable rate, if we are ever retrospectively to convert our books into electronic images, we will have to guillotine them down their spines to convert them into single sheets. These can then be scanned at high speed.

At one page per second the conversion task is daunting. At anything less, the task becomes impossible. The idea of using people to present individual pages to a scanner to retain the book in an undamaged form is ridiculous to contemplate for any but the most precious of our books.

Anyone having stood in front of a photocopier to copy a mere twenty pages from a book will remember how tedious the task was. Using this method, a speed of one page per 15-20 seconds might be achievable. However, no-one would seriously suggest committing a team of people to such a purgatory for one month let alone the hundreds of years the task would take to complete. It is possible to conceive of an automatic page turning system linked to a sophisticated scanning head, but the accuracy, speed and reliability of such a device must be questionable. The library market is a small and specialised market. In any one year only a few of the major library systems might consider it necessary or possible to embark on a large retrospective scanning exercise, giving little incentive to potential suppliers of such systems. This is why I believe, probably for the first time ever, the technology will not come to our rescue when we decide to embark on the task of converting existing documents and books into digital images. We really have nothing to gain by waiting. Our collections will just get bigger and the task will become yet more unmanageable the longer we delay.

Let us not forget Sir Frank Francis's remarks of 30 years ago about librarians having forgotten what the true purpose is of their task. I hope most librarians would agree that, with very few exceptions, the most important feature about books is what they say and not what they look like. We are in the information business. Few books are "special" as objects. With more and more authors producing books with wordprocessors, this situation will continue. If it is usually only the information that is of value, it might well be legitimate to convert that information to the most convenient form to store and distribute even at the expense of the original format. Clearly the thorny question of copyright will have to be addressed but this is being worked on at present and a satisfactory compromise is sure to be found[6]. Guillotining a book down its spine will allow the individual sheets so produced to be scanned at high speed. Once scanned the original sheets and covers could be packed away in boxes and stored in a purpose-built warehouse in some location where it is economical to site such a building or, alternatively, they could be discarded. The use of a warehouse is not as final as would be discarding and is sure to be the more appealing alternative until the new technology is fully trusted. However, there is another option that is very safe and well worth investigating.

Let me digress for a moment. At the start of this section I said scanning could be done in one of two ways. Scanning the images directly into magnetic or optical storage is one possibility but I tend to prefer another, slightly less direct way to achieve this end. I refer here to the use of intermediate photographs. Using a similar method to the direct method to present the pages, instead of digitised images, photographs are taken of the documents as they pass under the scanner. The speed with which this can be done rivals the best speeds achievable with the other method. The photographs are of high quality and can be called back automatically through an enquiry system linked to a juke box holding hundreds of reels of these images. The required image can be scanned, digitised and presented to the reader within a few seconds and while that first page is being examined, subsequent pages can be digitised ready for the user. Once digitised the information could be retained for further use. In this way a document is only ever fully digitised when it is required. Another advantage of this system is that, as improvements are made in presenting images to users, the ready availability of good quality photographic images can be used to create even better images than are now available without the need to rescan the original documents. In addition, far less optical storage would be required than with the direct method. The trade off is in the speed with which images can be presented. However, by comparison with the present system involving travel, searching and bookfetching delays, sometimes amounting to many hours, a delay of a few seconds should be acceptable!

The purpose for my digression was to show that if scanning is completed soon it will not, necessarily, forever lock a pioneer library into only being able to provide an image the quality of which is limited by today's technology. The availability of a good quality photographic image will allow that library repeated bites at the cherry.

I don't want to underestimate the problems involved in converting the contents of 5 million books into images. It is a huge task. Nevertheless, this is no time to be overawed by the scale of the problem. Assuming it will be possible to scan single sheets at a speed of 1 per second, let us examine some of the implications of one possible working scenario. Earlier I calculated we would require 26 scanning workstations to complete the task in a ten year period. How would we tackle the task?

If we scan at 1 page per second, an average size book of 300 pages will be scanned in 5 minutes. With 26 such scanning stations in operation, we will scan at a rate of 300 books per hour. This is the minimum rate at which books will have to be selected from the stacks for the guillotining process. Immediately, we can envisage five distinct teams of people. We will need a team of skilled book selectors identifying those books to be guillotined. As the vast majority of books will fall into the category of books that may be guillotined, a small team of 3 people selecting books at an average rate of 2 per minute could keep up with the demand from the scanners. A team of 9 people would be needed to man the 26 scanners and to keep them fed with documents. Another team would be needed to transport selected books from the shelves and to the guillotines as well as to package up the cut books and convey them to another location. Four such people would be needed. In total, about 20 people, mostly un-skilled would be needed for the scanning operation.

A team of indexers for the important indexing operation would link a scanned document with its already existing catalogue record. There are a variety of methods we could use for this operation. One possibility would be to use ICR on title pages and then check for matches in the catalogue. Another possibility would be to make use of our pressmarks to identify titles in the catalogue. In any case, some skilled indexing work will be required. A team of five people could cope with this requirement over a ten year period.

A Summary of Costs

The staff costs to finance the scanning operation requiring 20 people over a ten year period would be in the region of £3 million.

A team of 5 indexing staff over the same period would cost another £1 million.

The cost of the equipment such as computers, workstations, network and guillotines might cost a further £3 million if we adopt the intermediate, photographic option mentioned above. Let us also allow a further £3 million to cover the costs of converting the small numbers of "precious" books to retain them undamaged.

The project might cost a total of about £10 million at today's prices. However, even if my cost calculations are out by a factor of five, they would still be attractive.

Perhaps at this stage we should ask ourselves, "Does this represent value for money?".

There are two ways to look at this and, fortunately, both give equally positive results. The first is in purely long-term cost terms. The expenditure of £10 million on this project will eliminate the need to provide additional space to house our increasing collection. This building cost appears to be £2 million per annum, on average. Disregarding the other substantial saving mentioned earlier, at this rate, the project will have paid for itself within 6 years just through the building cost savings. The second way to look at this expenditure is through the different services provided. With such a system it will be possible for remote users to go to their local library and from there be able to access the collections of the national library. The local library would have the high quality screens needed to display an acceptable image of the required document and would be connected to the network via the high speed link needed to provide an acceptable screen filling rate. The savings in time and cost for individual users, particularly distant users, would be significant and a small use charge could be introduced to offset running charges. Additionally, many more users would be able to access the collections of the national library than ever before. For the first time in its history, the full wealth of our National Library will be fully used.

Conclusion

National libraries in Britain, and probably elsewhere in the world, are obliged, annually, to embark on significant cost cutting exercises in the face of rising costs for books, buildings and staff. We have all been asked to reexamine our collection development policies and an almost inevitable result will be a reduction in the coverage in each of our national libraries. There is no way of knowing where these reductions will stop. Before we are pushed too tightly into a corner from which there will be no escape, we in the NLS are determined to examine all possibilities that will enable us to continue to develop our collections unhindered and allow us to provide our readers with the full range of older material already available to them. A large scale document imaging project appears to contain all the elements we require at an affordable, contained cost that should appeal to our paymasters and with facilities that will appeal to our users.

Initially I expect substantial user resistance to this project. I will be told it is sacrilegious to destroy books, even books that will never be read. I will also be told that looking at the image of a page on a screen is not the same as looking at a book. Arguments about the feel and smell of books will be thrown at me. Unfortunately, valid as some or all those points are, none will help the National Library of Scotland provide a more cost effective service that could be made available to more people. A national library is not the same as a national museum. In our case, our objects are usually less important than the information contained within them. Perhaps the solution will be to have two different types of organisation devoted to the book. The one will be a book museum whose specific purpose will be to protect and display precious books. The other will be an information library containing just the information contained within books and with facilities to get that information quickly to whoever needs it. Indeed, because of the nature of this system, we will be able to distribute our information to other libraries and to access information held by other libraries in a seamless, transparent manner. The conversion task can also be distributed and shared.

The early stage of planning a pilot imaging project within the National Library of Scotland is already underway and we are hoping, with the aid of EEC assistance, to embark on a shared project with a Spanish partner early next year.

I know many of you will dismiss these ideas as so much pie in the sky so let me finish with another quotation by George Bernard Shaw. He said,

> "You see things and say 'Why?'. But I dream of things that have never been and say, 'Why not?'".

There is nothing so powerful as an idea whose time has come and there can be no doubt that the time for imaging systems in libraries has most definitely come.

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Electronic Publishing: Possibilities, Barriers, and Environment in Slovenia and Past Yugoslavia

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Abstract

Electronic delivery mechanism is still introduced in Slovenia and Yugoslavia.

The successful use of electronic message transfer and electronic delivery products depends on the well organized co-operation of all, libraries, information centres, and users.

Traditional library behaviour, difficult political situation, bad economic possibilities, and other specific barriers are obstacles in the development of user friendly electronic publishing systems. It is hoped that new communication technology will improve our library services. This process will be long and difficult.

Electronic Publishing: Possibilities, Barriers, and Environment in Slovenia and Past Yugoslavia

INTRODUCTION

I don't like to begin my contribution with speaking about the political situation because I never was a politician; but today's situation in my country Slovenia and Croatia and other republics of Yugoslavia which exist no more is dramatic. This situation presents a very important barrier which paralyses all kinds of communication and its impact through past Yugoslavia.

The most modern existing technology and telecommunication is involved in the process of political and economic change in our country and it works practically only in Slovenia.

Therefore, I shall limit myself primarily on Slovenia which has successfully developed electronic transfer of information and documentation in libraries, information centres and research centres.

BRIEF HISTORICAL DEVELOPMENT

Libraries in the developed countries had, already almost two decades ago, intensively communicated on all levels (local, regional, national, and on international level) and among all types of libraries and information centres with the aid of informational technologies. Computers, telecommunication, new types of publishing (DTP), and new centrally designed cooperative library networks like OCLC are successfully implemented. In the meantime we began discussions in our country about the isolated systems supported with big computers. In addition, our libraries were receiving only marginal attention of the society; more attention was given to information documentation, so called INDOK departments, or centres established in the seventies, usually separated from the libraries. INDOK centres had all priorities, financial means and the relative technology. The prevailing opinion in the society of that time was that with computer technology and some professionals the problem of access information and documentation could easily be solved. Even the top professionals had defended the idea of unimportance of libraries. Our libraries, especially university libraries which followed the development around the world, had to fight for financial means and big computers. But long tired discussions with Ministries of Science, of Education, and Ministry of Culture and several other institutions at one side and on the other side hard discussions among libraries about new organisation supported with new technologies resulted only in very bad relationships.

After 1980 mini- and micro-computers have penetrated in libraries of the developed countries. Some years later we were lucky too in this respect. Slovene National and University library (NUK) purchased in some odd ways several ATARI's and half of them were given to some other libraries. Central technical library (CTK) University of Ljubljana got one ATARI. Soon afterwards, thanks to the management's inventions, CTK purchased several IBM compatible mini-computers.

I shall not stress on the problems which were not solved immediately at the meetings, discussions, and other sessions, about most suitable organisations and implementation of electronic network in Slovenia and in Yugoslavia. In addition, suitable software support had to be developed. Disputes and misunderstanding among librarians, document information professionals, and computer workers were typical features of the situation. Of course, the political conditions in the environment which we live in caused great stress among individuals and institutions on the local, regional and highest level. We began with wide education programmes of ourselves and the users in order to establish computer based systems of libraries which is adapted to the needs of individual libraries and sometimes connected to joined network.

At that time in 1987, IZUM was established in University of Maribor as host for the library system (KIS) and another system for science and technological information (SZTI) for Slovenia and Yugoslavia. In the field the Slovene general post office (PTT) built public data network JUPAK in 1985, after many years of very hard conceptual discussion between the republics. Among the first 250 enterprises in Slovenia which joined their capital for the building of JUPAK network, CTK was the first and only library.

I am free to say that in those times the beginning of automation and communication connection was the result of enthusiasm of only a few people from the various fields without financial support.

But today we can already speak of professionalism. General post office and users joined and invested 0,2% of gross social product into development of adequate communication technology and standards in the last ten years (governments in developed countries and general post offices invested 2-3 %).

Today we have a network which enables the electronic communication, publishing, and almost all electronic services.

Following types of communication technologies and standards are existing:

- Integrated Services Digital Network (ISDN)
- OSI application protocols available to develop electronic document delivery systems x.400
- Packed Switched Public Data Network (JUPAC)

Today, the new technology enables:

- electronic interlibrary loan
- electronic publishing
- facsimile transmission as a normal means of communication
- CD - ROM searching

To create fully integrated electronic document delivery systems or publishing systems it is necessary to integrate and follow all international standards and technologies.

Such systems will eventually allow users to select, request, pay for, and obtain documents directly from their workstations.

Although we are theoretically and technologically prepared for electronic information communications this is not a sufficient condition for its wide use. There are still many barriers in our society, which are not so easily disposable. They are:

- political - economical
- immature environment regarding information
- insufficient personal motivation.

POLITICAL - ECONOMICAL BARRIER

Although the electronic mail helped the news to go into the world during the recent war in Slovenia in June 1991 through university BITNET and JUNAC network very quickly, the everyday use of this kind of communication demands big financial means. Big financial support is given today for researchers by the Ministry of Science. In general our economical - political situation is a strong barrier. Extensive use of databases, CD-ROM, etc. by users in libraries and information centres needs financial support and regular funds.

IMMATURE ENVIRONMENT REGARDING INFORMATION

Many end-users and also librarians are not aware that they need information in the first place. It is difficult to know what you don't know. Our environment is not yet conscious that publishers and computer personnel have to participate equally in the development of information network, where the library and information centres are an important link.

INSUFFICIENT PERSONAL MOTIVATION

The use of new technology, electronic services end products demands permanent education of personnel and end-users. If there is no financial stimulation the realisation of education programmes is slow and problematic.

The changes caused by new information technologies produce many big problems for traditional book-oriented librarians. Constant changes and adaptations are required and are being introduced in order to develop in accordance with the trends in the field of library-information science in Slovenia. All that will undoubtedly contribute to the creation of an effective electronic transmission system.

CONCLUSION

The present changes existing in our macro- and micro-surroundings have the characteristics of the process, which is accompanied by many problems. The continuous solution of problems means also the better organisation of work and greater use of the possible achievements.

Still, we must not forget the John Nesbitts saying:

"We must learn to balance the material wonders of technology with the spiritual demands of our human nature".

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State of Art and Current Trends in Library Automation in Scandinavia

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Abstract

The Scandinavian countries have all open west-oriented economies and are important parts of the European culture and history. Simultaneously, they are small, independent, nationalistic countries with well defined ethnic groups and each country has a language of its own.

These two parallel facts are clearly mirrored in the development of library automation within Scandinavia, on hardware as well as software side.

Also, efforts are now and then made to create bridges between some of the library system projects through internordic bodies within the university sector.

Furthermore, Scandinavia shows several examples of the "fight" between centralised and local systems philosophy.

The library automation market in Scandinavia shows principally three segments, each developing its own way and trend: The university segment, the public library segment, and the special and corporate library segment.

State of Art and Current Trends in Library Automation in Scandinavia

INTRODUCTION

The Scandinavian countries have all open west-oriented economies and are important parts of the European culture and history. Simultaneously, they are small, independent, nationalistic countries with well defined ethnic groups and each country has a language of its own.

Scandinavian countries fortunately have had a fairly good economic development during the last 30-40 years. This has created a positive background also for a variety of investments and spending in the information and library sector.

Interestingly, statistics show that total investment in this sector in Scandinavia is clearly above the average for Western Europe, with Denmark on leading position, followed by Finland. Especially on the public library side the ambitions have been very high in Denmark.

With this positive background in general, it is interesting to see the development trends in library automation in the small Scandinavian countries. We can follow mainly two lines:

FACTS FAVOURING NATIONAL SOLUTIONS

The following facts have supported solutions within each country:

- **Each nation has its own language and pride**

  This is the most typical and normal background for national solutions in all countries. Also in Scandinavia.

- **Governmental funding to the university sector has been fair also for EDB development**

  This situation has perhaps especially supported the development of good nationwide accessable catalogue systems, e.g. LIBRIS in Sweden.

- **Each nation is small enough to accept one common - or dominating - solution in public libraries**

Denmark is a good example where the communities have strongly supported the development of joint library systems.

- **National unique hardwares have created national software solutions**

  The library area is sometimes technology driven, perhaps more often than we think.

  In Norway, the earlier success of Norsk Data, ND, and their mini-computer range, created also very interesting national library systems.

  Recently, the Danish Supermax library system, based upon the success of a unique Danish mini-computer, is another example.

- **NIH-syndrom**

  In most R&D-areas there is a tendency to be a bit doubtful about things NOT INVENTED HERE.
  This also applies to the library areas, where many libraries of course easily favour "home-made" solutions also on library automation.

FACTS FAVOURING INTERNATIONAL SOLUTIONS

We can clearly see an increasing interest in more international solutions, based on e.g. the following facts:

- **Scandinavian countries are generally very open and export/import-depending**

  Each Scandinavian country has a small "home market". Therefore, industry and commerce have always been forced to be international to grow in size. Consequently, Scandinavia has a high proportion of internationally operating industry companies, especially in Sweden and Finland.
  Also, the import volumes are high, partly depending on a lack of natural resources in Scandinavia, partly on the fairly good economy (earlier) that has allowed Scandinavia to import attractive products in large scale.

  This general attitude also opens Scandinavia for international library softwares and hardwares.

- **Leading hardware suppliers are international, and outside Scandinavia**

  We all know that IBM, Digital, Hewlett Packard, and many, many others are strong suppliers, dominating the hardware scene.

  To "feel safe" also Scandinavian libraries often chose such hardwares and may also prefer international softwares based upon those computers.

- **Systems for university libraries are rather universal! Leading softwares from USA, Canada, GB apply reasonably well also for Scandinavia**

  With moderate modifications, apparently many international local systems are attractive to Scandinavian university libraries. A most striking example is VTLS in Finland, where the government supports a nationwide project installing the VTLS system in the whole university sector.

  Another example is Sweden where GEAC, VTLS, Libertas, and other international local systems, have had success.

INTER-SCANDINAVIAN EFFORTS

In the library and library automation area there have been and are currently several interesting Nordic projects, as well as European projects, basically within the university and research library sector.

NORDINFO is an important tool and organization for many of these efforts.

This whole area of inter-nordic and inter-european projects is so exiting for Scandinavia that it should be dealt with by proper expertise at another Essen Symposium - and it will not be commented upon further here.

BASIC MARKET SEGMENTS FOR LIBRARY SYSTEMS

Following an agreement with the local organizers here to concentrate on the situation for local library systems, we now turn to the fact that we have basically 3 market segments for local systems:

- University library sector
- Public library sector
- Corporate/special library sector

University library sector

In this sector we find mainly large local library systems, in all Scandinavian countries also supported by nationwide "catalogue systems" (e.g. LIBRIS in Sweden). Most major Scandinavian universities are now running fairly modern softwares, usually on dedicated computers from the large international manufacturers. However, the smaller or more odd university institutes are still often poorly supported by library automation systems.

As mentioned VTLS, GEAC, Libertas, and other international automation systems seem gradually to dominate the Scandinavian university market.

Public library sector

This market segment is still dominated by various "national solutions", within each Scandinavian country.

From an earlier strong focus on centralized systems for the whole country there is now a quick move into *a large variation of local systems*.

It is apparent that the *management philosophy of decentralization* is mirrored also in the community sector, where there is an increasing variety of library systems - mainly for book handling - available - and appreciated.

There are too many names of systems to mention them here.

Corporate/special library sector

Within this market segment we find the largest variation in library automation. It includes many larger as well as smaller libraries not yet automated at all.

In this segment libraries also more often focus on automating just parts of the whole operations, e.g.:

only a book catalogue,
only a book loan system or
only a periodicals/serials handling system.

For larger corporate/special libraries there is, however, a clear trend to favour and install complete, integrated, local library systems, usually run on mini-computers or PC:s (e.g. TINLIB, NEWLIB, ERILIB and several others). There seems to be a strong fight between systems developed within Scandinavia and systems from the international scene. Especially the local technical support is important, as many libraries in this sector - are not at all supported by an EDB department of their own or within their own organization/company.

TO SUMMARIZE:

The library automation scene in Scandinavia shows several parallel trends, such as

- quick expansion of a blooming variety of local systems in all market segments
- strong wish for network solutions between libraries, however just started in practice
- continuous development of national catalogue systems, and a more easy access to them
- gradual increase of smaller computers - PC:s workstations, minis - replacing mainframes.

Libraries and Electronic Publishing: Issues for Academic Library Administrators to Address

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Abstract

A majority of academic libraries in the United States have begun to access information resources electronically through BITNET and the INTERNET. In addition, the use of CD-ROM technologies has led to local area networks for campus-wide access. In preparation for the new technologies such as CD-ROM and online public access catalogs on the INTERNET, as well as access to electronic journals, online bulletin boards and interest group forums, library administrators have begun to reallocate fiscal and physical resources and staff.

In planning for a more electronically-oriented future, it is imperative that academic library administrators prepare for the integration of new technologies and electronic information into our libraries. This presentation will focus on the issues to be addressed including changes in organizational structures and staffing; relationships with computer centers, media services, and similar groups; telecommunications capabilities; collection development as it relates to electronic resources; fiscal needs; space/facilities; equipment needs; staff and library user education and training; and policies and procedures related to electronic access versus ownership.

Implications for the future integration of electronic information into libraries and impacts on current services and operations will be discussed.

Libraries and Electronic Publishing: Issues for Academic Library Administrators to Address

Introduction

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Innovative projects at institutions such as the University of Southern California, Cornell, Johns Hopkins, Clemson, and Carnegie Mellon are evidence that the electronic library is becoming a reality. On a smaller scale most academic libraries have begun incorporating electronic information technologies in the range of services provided to library users. Yet library administrators face significant challenges as they prepare to implement this vision. This paper examines three sets of issues related to libraries and electronic publishing. It will look at the converging roles of libraries and computer centers, the issue of financing for the very expensive new technologies, and the implications for internal library operations.

Libraries and Other Information Handlers

Historically the roles of academic computing centers and libraries have been differentiated. Computing centers have provided expertise in systems development as well as considerable resources of hardware and software in support of campus requirements for academic and administrative computing. As a service center, computing has typically reported to the administrative side of the university. Libraries have provided the expertise for the acquisitions and organization of knowledge and the provision of a wide range of services to support the use of that knowledge for academic and research purposes. Libraries traditionally have reported through the academic side of the university. The paths of these two entities first crossed in a significant way with the implementation of major library automation projects in the 1960s and 1970s.

The exploding information technologies of the 1980s not only began to blur the traditional roles between computing centers and libraries, but also brought media centers and telecommunications into the picture with expanded roles. At some institutions, efforts to manage these converging technologies resulted in changes to the university organization chart, most notably the advent of a new, high level position called the Chief Information Officer (CIO). The CIO has been defined as "a senior executive of the organization responsible for information policy, management, control, and standards." (Penrod, Dolence, Douglas, 1990)

Woodsworth (1988) suggests the CIO position has been established for four purposes:

1. To provide fiscal control of expensive technology;
2. To pursue compatibility in the computing hardware and software;
3. To effect closer collaboration among all parties involved with the new technology; and, finally,
4. To satisfy the university president's need for one spokesperson to advise on the university's information technology needs.

Woodsworth found, in 1987, that about one-third of the parent institutions of member libraries in ARL (the Association of Research Libraries) had established Chief Information Officer positions.

There has been much discussion in the literature about how best to organize and manage information technologies. While many institutions have chosen to create chief information officers, the scope of the CIO position varies from university to university. The library tends to be the one unit for which the CIO often has little or no direct responsibility. However, with the appearance of the electronic journal and full text databases, the distinction between information and technology will become even more blurred. Many argue that computing centers, telecommunications units and libraries are all dealing now with a single commodity--information. As a result, library leaders address difficult questions:

- What will be the future role of the library?
- Will two parallel information systems prevail, with the library evolving as the custodian of printed material and the computing center evolving as the custodian of electronic information?
- What role should each information handler play in the future management of new technology (library, computing center, media, telecommunications)?
- How can collaboration be achieved among units with historically different attitudes and behaviors?
- What critical questions should library professionals be asking?

Paying for New Technologies

How much to pay for new information technology is a concern in the mind of all library administrators. The potential price tag is very large. It is ironic that the electronic library is becoming technically feasible at the point in time when universities all across the United Stats are facing an uncertain economic future.

At the moment, United States colleges and universities are investing millions of dollars on capital renewal projects--projects designed to wire aging campus buildings to accommodate voice, video and data and to link classrooms, libraries, media centers, dormitories, scholar workstations, and remote campuses.

Our institutions are also faced with a burgeoning demand for computing capacity to support sophisticated library systems, administrative and academic computing requirements, and the data processing needed by the university's research community.

For libraries, electronic information means new expenses--for licensing site fees and copyright royalties; for telecommunications and wiring; for hardware and software; for maintenance, repair, and other aspects of operations; and for subject and technical specialists and other staff to provide the library services which end users require. The printed word will be with us for a long time into the future and maintaining traditional library collections will remain a part of the library's future. To develop creative strategies for financing new forms of information while still maintaining traditional library collections is the challenge for library administrators.

In the current economic environment, it is unlikely that either libraries or their parent institutions will experience major infusions of new funds--to finance education generally or new information technologies in particular. Existing resources will have to be redirected.

Many of the innovative, developmental efforts have been made possible by means of external grants from such sources as equipment vendors, foundations, corporations, federal agencies, and the bibliographic utilities. But since grants, by their very nature, have specified ending dates, they are not good sources for long-term funding. They are invaluable during the design, development and implementation phases but cannot be counted on for covering long-term operational and staffing expenses, for replacing worn-out equipment, or keeping staff and user skills current over time.

Another potential source of funding is private gifts of the sort raised by the university's development effort. Clark (1983) has suggested a strategy for marketing new technology to donors and this approach may be successful in those institutions with strong development programs. However, like granting agencies, private donors usually prefer to support innovative projects with a finite cost. Funding long-term operational costs is usually not attractive to them.

Over the long term, most of the money to fund electronic information must come from the library's basic operating budgets. This will mean more carefully defining priorities and making tough choices. Although our staffs and often our library users want it all, everything is not possible. The two budget lines which especially need careful analysis are the book budget and personnel funds. Libraries always will maintain traditional collections of printed material, but our recent experience with serials pricing has indicated that our frame of reference must shift from "ownership" to "access." Libraries do have experience with resource sharing, with traditional interlibrary loan, and with cooperative agreements. However, these have been viewed as supplemental programs to strong collection building. We do not have a great deal of experience with "access" as a primary mode of information delivery. Staff reductions is a particularly controversial topic when existing staff are overwhelmed by new demands and responsibilities. However, reallocation of staff and elimination of positions should be considered as it consumes a large percentage of a library's total budget.

Decisions about how the library reallocates internal resources will, by necessity, involve participation by others within the university community. Library relationships with other information handling units was discussed earlier. It is the library user who has a vested interest in how the library reallocates resources, especially if reallocations affect the book or journal budgets or mean a reduction in service hours.

Some of our teaching and research faculty who understand the potential for networked information are outspoken supporters. Certainly many faculty are appreciative users of the library's online catalog and the fact it can be accessed from workstations in their offices. While the concept of mainframe-mounted databases and LANs (local area networks) for CD-ROM (compact-disc read only memory) subscriptions may be intriguing to faculty, faculty often express support only if such activities are not at the expense of further journal cuts and service hours. And for other library users electronic journals, and the concept of "access rather than ownership" frame of reference may pose a threat to long established patterns of scholarly inquiry. Gaining faculty support for new patterns of access will challenge us to think creatively about alternative strategies. Buying information on demand is one approach. For example, when a faculty member needs an article from a journal not in our collections, we could purchase a copy of the article from a firm offering rapid delivery. The money which would go for subscribing, binding, and storage costs could instead be used to purchase the necessary information when needed. The goal would be to achieve access costs which are lower than the subscription costs. Obviously, we need much more information on how to create a decision-making model. We also need more information about user acceptance.

Library administrators also need to look at how cooperative ventures between libraries or groups of libraries might offer opportunities for financing electronic information. Consortia and other cooperative agreements are one area in which we do have good experience.

And, finally, librarians need to be talking with vendors about pricing strategies for electronic information. Libraries need pricing plans which offer the flexibility to purchase only products that are needed rather than packages which link a desired product with one which is not desired. Vendors also must take more notice of archiving requirements. It may not be cost effective to maintain paper subscriptions only because electronic editions are not maintained beyond a particular time frame.

Implications for Internal Library Operations and Services

Preparation for the new technologies requires a rethinking of the library's organizational structure, the allocation of funds, physical requirements, use of staff, and every other aspect of services, operations, and funding. The following explores some of the issues that we face.

A. **Leading or Bleeding Edge**

Jason L. Frand writes: "...the critical impact of information technology has been a change in the cultural environment at...institutions, as reflected by values, beliefs, and behavior. Specifically, faculty, students, and staff have come to view access to state-of-the-art, interconnected information technology as a right and not a privilege." We do not disagree with Jason Frand, but it's not this simple. Those he speaks of as "faculty, students, and staff" are not the majority of our users on all of our campuses. They are a new breed, placing new pressures and demands on our staffs. We still have those faculty, students, and staff who are not "computer-literate" and who oppose library funds targeted for automation, "access" over "ownership," and the loss of the "paper" card catalog.

The implications of the new technologies and electronic publishing are, indeed, transformational, but not so rapid that all of our users are willing to support a reallocation of funds from more traditional print resources to electronic access. The re-education of faculty, students, and staff for new forms of scholarly communication and daily operations is not a minor undertaking, but it is a necessity if libraries are to prove successful at their missions.

There are library users who feel that libraries are moving too fast into an electronic age, committing the institution to greater expenditures in this area than some feel is warranted, and creating, others feel, gaps in traditional materials. Some even go so far as to state that cancellation of journals has led to detrimental effects on local teaching and research. As fears arise and problems occur, libraries must be prepared to address the concerns and institutions must be ready to reallocate resources and find new sources of funding.

Some university libraries are able to work towards the leading edge of technology while some others can barely maintain a "bleeding" edge. Each library must determine its own route--fast or slower--in adapting to change. There are advantages and disadvantages to each, but proper planning and communication is essential.

B. Strategic Planning

Getting the whole of a campus, or as close to it as possible, to buy into a plan and assist in its' development has its merits. Technology does hold significant answers in resolving some of the financial conditions (and increasing others) confronting our libraries and universities, but we must realize that hardware and software and an electronic environment is a means, not an end. Some institutions are ill-equipped to use technology with maximum productivity, usually because appropriate planning and collaboration did not take place in advance. Information technology should not be incorporated or planned without a concomitant plan for change in organizational structures. These organizational changes may be as simple as establishing standing committees/councils to work together to determine priorities and cost-sharing, or they can be as dramatic as having a CIO be responsible for administration of both libraries and computer centers.

Information technology is a tool that can assist in increasing productivity and effectiveness, but information technology alone is inadequate. A strategic plan, in place prior to massive technological change, allows for consideration for organizational redesign for more effective interaction between staff, users, and the technologies.

The strategic plans must include innovative human resource management programs. Effective public relations and communications activities must be a part of this. In addition, education/training and public awareness programs should be planned in advance and in place for staff and users prior to and after implementation.

In the planning process, staff and user needs can be surveyed for valuable input from all involved, including reaction to recommended priorities. When users and staff are involved in the planning process and help to set the agenda they are more likely to support the final results and sway others in adapting to change.

C. Organizational Structure

Organizational structures will change as libraries add technologies. It is crucial to consider what expertise and training will be needed. We must ask ourselves these questions:

- Who will have responsibility for what?
- How can existing staff be better utilized in an electronic environment?

- What new skills and positions are necessary?
- What positions can be reallocated, shared, or given up?
- What lower level priorities can be reduced or eliminated in order to focus on higher priorities in the newer, changed electronic environment?
- What does the electronic environment offer that the more traditional one didn't, and what disadvantages might it incur?
- What on- and off- campus relationships will develop--with the computer center, media services, telecommunications personnel, physical plant, publications offices, administration of university, faculty offices, student groups, and other local/regional libraries?
- What resources will need to be added or reallocated to ensure appropriate space, equipment, wiring/cabling, staffing, electronic storage, copyright/licensing fees or other contractual agreements, legal counsel, physical plant resources, security devices and control, ergonomic furniture, etc.?
- Will outside agencies be involved--for bid specifications, for voice/video/data installations, etc.? Who pays?
- Who will be responsible for planning and coordination of all of these activities?
- Who will do the education and training--vendors, consultants, other campus personnel, existing library staff?

It helps to bring together information service activities on campus under a common focal point, librarians, media personnel, telecommunications personnel, computing center staff, and others. By working together more closely, it may be possible to reduce duplication and find additional resources for implementing new technologies. Closer cooperation, collaboration, and coordination will reveal new ways to be more effective and efficient.

D. **Staff Reductions**

We need to reconsider ways that we can use technology to reduce staff. Librarians often state that automation does not decrease the need for staffing but only shifts staff from one area to another. Does this have to be true? Have we considered all the options? Can we model the use of technology in our own operations to demonstrate that it is possible to make such reductions? Many of our universities are "downsizing" or "rightsizing" through faculty and staff reductions. We should look for opportunities for technology to allow us to do the same so that we can continue to advance.

By identifying a pool of money generated through internal reallocation and new revenues to accomplish priorities, we assure our place as primary information providers. Some institutions reallocate 2 to 5% of their base budget each year by reducing, combining, or eliminating low priority operations and services and transferring the funds saved to high priority areas. There are valid reasons for libraries to consider similar reductions. The network's interest group forums for librarians can be a way to get promising ideas and theories from colleagues worldwide.

E. Other Concerns

Information overload, and selecting relevant and useful information in a networked environment is difficult for users. The organization of information is a major goal to be addressed, along with copyright; standards; storage costs; hardware and software upgrades/enhancements; and control, theft, and security issues.

a. Standards

Standards development is another critical implication related to libraries and the new technologies. As more information resources are added to the Internet, the user population grows and the time staff devote to assisting on- and off- campus users with technical connections and resources grows. The need for one common user interface to all of the electronic information services must be addressed.

b. Cataloging and Bibliographic Control

Libraries have been busy trying to keep up with printed resources in traditional formats. They have not yet gained adequate bibliographic control for title, abstract, and full-text access for those electronic resources available. This needs to be done.

A major problem is providing access to backfiles of electronic journals. Thus, not only do individual libraries need to consider ways of funding the often excessive costs in automation and networking but funding mechanisms are needed to provide improved access to and document delivery of the data in electronic format.

Because there is still little or no cataloging or indexing of electronic documents, there is a need for new and improved retrieval tools of online directories, thesauri and catalogs. Access information needs to be shared just as ownership information is now shared, i.e. by entering this into online-public-access databases and bibliographic utilities. We need to indicate access to electronic information at the national level in the way that ownership is presently indicated at the national level.

In addition, as information is being considered for inclusion on the networks, libraries must begin to place unique and special collections in both citation and full-text format on these networks.

c. Information Delivery

There is a need to develop new information delivery to users regardless of location or medium--at affordable prices. As we begin to focus more on "access" rather than "ownership" we must also determine when, and/or if, the library rather than the user picks up the cost for interlibrary loan and faxed copies of the documents obtained.

We also need a new information delivery paradigm in the library's ability to deliver information to users regardless of its location or medium. Some of this is being addressed by electronic interlibrary loan where individual users can fill in forms online, by electronic reference, by telefacsimile online through one's own personal computer, and by similar services. In addition to CARL (Colorado Alliance of Research Libraries) UNCOVER's telefacsimile service for articles in the CARL database, the new Faxon Finder database of contents pages of 10,000 journals in science, engineering, business, and medicine is now available via OCLC's EPIC and users can order by fax or through other means of document delivery.

d. Copyright

There needs to be an assurance that copyright fees are paid for access to individual articles. The issue of copyright fees for individual articles is being addressed by those making articles available via telefacsimile, but the issues of who pays is not yet resolved.

e. Ethics and Moral Issues

New technologies raise moral concerns about individual and institutional behavior. Some of the ethical questions include:

- What intellectual property rights should software developers have?
- Does information on individuals stored in a computer constitute invasion of privacy?
- Who is responsible for malfunctions or errors in computer programs?
- Will the computerized work week increase depersonalization, fatigue, boredom, new physical ills?

As new technologies are added to libraries' information resources, these questions and related ones should be considered.

f. Archival Files

How to archive files of older materials in a world of new, less tangible media must be determined. As of yet, there are no easy answers of how this issue will be resolved. How can we collect and safeguard databases and electronic journals as seriously as we collect books? Will publishers accept responsibility for making their electronic publications available indefinitely? Where should and do archival copies reside? These are only a few of the questions that have cropped up in recent years.

g. Preservation

The very factors that make the electronic medium an attractive alternative to print raise fundamental questions about preservation. What is the longevity of magnetic tape, disc, etc.? What problem will the fragility of storage media make for us in terms of preservation? What is the technological obsolescence of hardware and software? Will we have to retain and maintain many different forms of hardware and software because so many are incompatible now? How can we preserve content as opposed to discrete computer tapes, discs, or other storage devices?

To deal with obsolescence of electronic data uniform standards are needed for transmission, preservation, and for the transfer of electronic data between systems.

h. Global Questions

The global span of today's networks is making international data interchange commonplace. Libraries, corporations, governments, and individual information professionals must confront an expanded range of policy, economic, and technical issues which include:

- Marketing information resources on networks;
- Providing and managing access to networked information;
- Assisting with the transformation of scholarly communication;
- Providing for intellectual property law and constitutional protections in a network setting; and
- Providing for the validity and reliability of networked information.

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Use of Library Material in Both Paper and Electronic Media in an University Library

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Abstract

Following the laws of nature and technology the libraries move from simple to more differentiated ways of work according to organizational developments. In older university libraries all the working places for the readers were set up in one big reading room. When the libraries grew additional reading rooms for special methods of work were installed. Reading rooms for periodicals and for manuscripts were started, lateron seperated reading rooms for students were created. Additional reading rooms for different disciplines the so called 'Fachlesesäle' for medicine, chemistry, etc. developed. The technical development made it necessary to organize the reader places according to the form of the presented material. The use of library material in both paper and electronic media became necessary.

Special reading rooms for special collections with different tasks were created such as reading rooms for reference works, bibliographies and library catalogues with special library staff for answering telephone calls and personal inquiries. In addition to printed reference material other media have been added like COM, CD-ROM, online-connection to huge computer information centers, auditive media, cassettes for music or language teaching, which need sound-proof working stations and visual media with special equipments. The same applies to audiovisual collections like television or spectracolour vision.

We shouldn't forget that the books and the information material of a library are also essential for the handicapped people. Blind users need PCs with special electronic readers to get copies from printed books in braille lines or acoustic output in different languages. The physically handicapped people need special space for their wheel chairs to sit in front of terminals or PCs and to use all the electronic equipments as well as the books.

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We shouldn't forget that the books and the information material of a library are also essential for the handicapped people. Blind users need PCs with special electronic readers to get copies from printed books in braille lines or acoustic output in different languages. The physically handicapped people need special space for their wheel chairs to sit in front of terminals or PCs and to use all the electronic equipment as well as the books.

The paperless society concept as an idea has created much controversy and discussion, mainly in response to the works to F.W. Lancaster specifically his publication toward paperless information systems. His chief premise deals with current awareness. He summarizes some of the problems faced by the scientist in the use of the scientific literature:

1. Sheer volume of material that is submitted for publication and the rate at which this volume is increasing annually.
2. Increasing fragmentation and specialization which tends to cause greater dispersion of the literature in which anyone individual would be interested.
3. The cost of publication.
4. Delays in disseminating research information through formal communication channels.

The literature reflects agreement with Lancaster's predictions for paperless information systems for science and technology. The technological innovations will solve many of the ubiquitous complex problems stemming from our inability to read, assimilate, integrate and remember all relevant literature for prompt use. Paperless systems also will increase availability and save time, offer different intellectual considerations that may be even more difficult to sort out than the technological ones. By far the greatest obstacles to the achievement of functioning electronic information systems are the psychological ones. The growing importance of human factors in the "high tech-fields" were to define and assess the psychological aspects and human factors involved with computer technology. Human factors which make people resistant to technology of paperless systems include:

addition of serious responsibilities, alienation toward machinery, lack of understanding of the new technology and degrees of the interaction with other people. Paperless systems will change the context in which the work is done. The technology will affect social relationships that presently exist in the workenvironment. One has only to listen to the media to know that the so called revolution to the paperless society has begun.

University libraries will have to learn new methods and techniques to market the paperless services they will provide. Lancaster says and sums it all up: "I don't think that there is any long term future for any library in the form that we knew it - libraries as collections of physical artifacts are rapidly becoming obsolescent. Technology may well deinstitutionalized the library from archaic roles and release it for new roles of enormously greater potential."

In the following chapter I want to compare some current awareness services, index- and abstracts services which exist as paperversion, on diskette or CD-ROM and online in different datacenters as DIALOG or BRS, BLAISE or DATA-STAR. The information department of the University Library of Graz has been doing online retrieval since 1978 in more than 30 data centers and CD-ROM searches since 1988. Now the library has 7 single CD-ROM stations with more than 60 CD-ROMs. Up to the end of the year we expect to have over 70 CD-ROMs. In addition to this, thanks to a joint project between the library and the EDP-centre of the university all the CD-ROMS shall be made accessible via the university-LAN which is an Ethernet. The most heavily used CDs shall be stored for simultaneous in 6 CD-ROM-towers with seven drives each (ll together 42 CD-ROM-drives) these are connected to the LAN by a special software which allows DOS-applications in a VMS-environment. All the other CD-ROMs will be stored in a jukebox which can hold up to 100 CDs. This jukebox will be made accessible via a dedicated PC which will be integrated into the LAN like one of the other CD-drives. The difference is that the CDs in the jukebox are for single use only and cannot be accessed by several users at the same time. For all the CD-ROMs special licences and contracts are needed. The prices depend on their use in a single workstation or in a LAN.

Current awareness services

Current Contents (CC) print version produced by the Institute for Scientific Information (ISI) in Philadelphia/USA is multidisciplinary and available in seven editions each covering a group of related disciplines. The first year of CC shows in some way the importance of the discipline.

- Life Sciences (approx.1200 journals)	since 1958
- Physical, Chemical & Earth Sciences (800 j.)	since 1961
- Social & Behavioral Sciences (1340 j.)	since 1969
- Agriculure, Biology & Environmental Sciences (1000 j.)	since 1970
- Engineering, Technology & Applied Sciences (800 j.)	since 1970
- Clinical Medicine (850 j.)	since 1973
- Arts & Humanities (1200 j.)	since 1979

Current Contents on Diskette with abstracts, are available now for five disciplines:

- Life Sciences (995,-$)	since 1988
- Agriculture, Biology & Environmental Sciences (795,-$)	since 1990

· Physical, Chemical & Earth Sciences (795,-$)	since 1990
· Clinical Medicine (795,-$)	since 1990
· Engineering, Technology & Applied Sciences	since 1990

The introductory prices were cheaper (about 100 $ each) than the prices shown. All prices are for single stations subscriptions. Current Contents on Diskette provide weekly access to bibliographic data from thousands journals and books. Current Contents on Diskette issues contain the same journal contents as print version. In addition to this diskette issues cover every document type and the following key features are included:

1. Simultaneous searching in two fields within an article's record - the title field and the 'KeyWords Plus' field which includes significant words appearing in the article's bibliography.
2. Automated browsing providing full bibliographic description of all articles. The reader also can browse by discipline.
3. The ability to download selected references in text fields to word processors and database programs.
4. Automated ordering through the 'Request a Print' and the 'Genuine Article' functions. Most useful is that Current Contents on Diskette also provide abstracts.

CC on Diskette is available for IBM-PCs and their compatible microcomputers, the Apple Macintosh and the NEC-9800 Series microcomputers. Weekly issues on floppy diskette are available in 5 $^1/_4$“ or 3 $^1/_2$“disk size.

Till at the end of 1990 nearly every institute of the Medical Faculty of the University of Graz had an individual printed edition of Current Contents Life Sciences. (From 32 institutes 25 had a printed copy of CC, that are 78%.) This year only 5 institutes (that are less than 16%) have a combined printed and diskette version, all the others have Current Contents on Diskette only. More than the half use the Macintosh, the other the IBM-DOS variant. Some of the institutes have subscribed to the small variant of CC, the J-600 which includes the 600 highest impact journals, the others prefer the J-1200 edition, which offers the full coverage of 1200 of the leading journals in the field of life sciences. The Main Library of Graz till now only has the printed edition of Current Contents and many users are expecting the library to have it.

The Current Contents online database permits a weekly update and is available at BRS (Bibliographic Retrieval Service), DIALOG and DIMDI (Deutsches Institut für Medizinische Dokumentation und Information).

The scientific staff of the University of Graz has never asked for searches in the CC-online database despite the advantages of weekly updating, users prefer SDI (selected dissemination of information)-services in the SCI-database.

But for the next year the University Library of Graz is planning new methods together with the computer center of the university. The library will buy either Current Contents on discs or the complete tape with all 7 Current Contents editions, the computer center will load the discs or acquire an appropriate retrieval-software or develop a special software which would be similar to the retrieval system of the main library short title catalogue. The institutes of the campus of the Graz University and many of the institutes spread over the whole city are connected to the computer center via Ethernet. From 1993 on all the individual editions of Current Contents on Diskette will probably not be bought any longer, except by those institutes which have no connection to the LAN. Nevertheless approximately 20 % of all institutes use the paperversion of Current Contents because some faculty members like to read the issues at home, in the train or at any place, where they don't have a personal computer.

Index services

We find some new aspects of library services, when we compare information products which exist in three or four different forms:

1.2. Bibliographies in hard copy (books and/or microfiches);

3. Online-databases;

4. Discs or CD-ROMs.

We find some of them in each of these forms in big libraries, because different users are interested in each version. In many libraries we can see that the printed edition and the PC-version of a bibliographic tool are not kept in the same room. There are special reading rooms for different disciplines like medicine, chemical or physical sciences or biosciences. There we find the journals but also the printed bibliographies, current awareness, index and abstracts services. Some libraries have special reading rooms for the different index and abstracts services in addition to the special reading rooms. The technical equipment for online-services needed by the information specialist are usually set up in a separated office, where the scientist has the possibility to discuss with the librarian the necessary keywords, phrases and subject headings concerning his question. Sometimes it is useful to prepare a search in connection with the printed version.

1. Science Citation Index (SCI) and Social Sciences Citation Index (SSCI) are published in hard copy and partly microfiches (Journal Citation Report/JCR) in CD-ROM and online format. The University Library of Graz has a current subscription to the printed edition since its beginning, that was in 1961 back to 1945 with all the 5- and 10-year cumulative editions. The use of the two printed editions (SCI and SSCI) is still about ten times higher than that of the online version, which the information center of the University Library of Graz has used since it was made available, at first directly from the Institute for Scientific Information (ISI) in Philadelphia, then from DIALOG and DIMDI (SCI also from DataStar and ORBIT, SSCI also from BRS). At UBIS that is the Information Service of the University Library of Graz most of the searches were dealing with the number of citations of publications written by members of the teaching staff of the university. Since 1988/89 SCI and SSCI have been existing in the CD-ROM version back to 1980 and 1981 respectively. Since then online searches have been diminishing as the scientists prefer to do their own searches in the information center of the library. Some of them produce enormous paper print-outs the others use downloading on diskettes, which they bring with them. The library asks users to bring new diskettes in order to prevent that computer viruses are infiltrated into the system.

2. Index Medicus (hard copy and/or microfiches); Medline (with abstracts: online and CD-ROM)

   The University Library of Graz had till 1978 only the printed edition of Index Medicus, published monthly, which can be found in the main library in a special reading room for biosciences. It was used only by the scientists of the medical faculty, not by the students because medical students in Austria don't submit theses. Later the library cancelled the printed edition and ordered the microfiches to save space. In the same year the library offered the new possibilities of online retrieval, at first from BLAISE (British Library Information Retrieval Service), then also from DIALOG and some years later from DIMDI and DATA-STAR. Index Medicus and Medline are produced by the National Library of Medicine (NLM) in Bethesda, Maryland (USA) based on an extensive thesaurus control via MeSH (Medical

Subject Headings). Half of the searches done in the information center in Graz were done in the Medline database. The hard copy version was primarily used when the information service temporarily was not staffed.

Since 1988 the library has been subscribing to the CD-ROM Medline on SilverPlatter and has till now all the disks back to 1983. The retrieval software of SilverPlatter is an extremely userfriendly version. This is what the librarians and the users unanimously say. More than half of all CD-searches are done from Medline CD-ROM. Some institutes have also subscribed to Medline CD-edition, but in the MacIntosh version. There are three mechanisms which allow retrieval either by natural language or through the controlled thesaurus. The commands are "find", "index" and "thesaurus". The "find"-command causes a search in the database for words or phrases which appear in the title or abstract of the article. It also can be used to specify other types of search where the user knows the appropriate field qualifiers. The Medline database itself is not an easy one to use for the end-users, but thanks to a userfriendly software excellent results can be retrieved.

There are five versions of the Medline database currently available, but SilverPlatter is one of the two market leaders. It offers a straightforward approach particularly to end-users which contrasts with its main competitor's detailed menu approach.

Abstracts services

Library and Information Science Abstracts (LISA):

hardcopy, online and CD-ROM

The printed version is a guide to articles from over 350 periodicals from 60 countries and papers from major English language conferences. The subject fields covered include library science, information science, and subject disciplines which are likely to be of interest to librarians and information workers such as: online information retrieval, new information technologies, book selling and publishing. Coverage of report literature is restricted to selected series. Each issue of LISA is divided as follows: an abstract sequence arranged in a classified sequence with each abstract provided with a classified number. A full bibliographic heading, a unique serial number, a full bibliographic citation and a note of the source of the abstract; further a name index, an alphabetical subject index and a journal index.

Online searching is offered via DIALOG, BRS, and ORBIT. LISA is also available on magnetic tapes, including all backfiles to 1969 and on CD-ROM from SilverPlatter also back to 1969.

Since the moment when the University Library of Graz started offering CD-ROM services in addition to the online-retrieval services, the online service has diminished by half. Nevertheless, users who do their own searching on CD-ROM ask the information specialist for an online search when they have a complicated question or when they have got no results at their searches. Then the information specialist prepares the search more thoroughly in combination with the MeSH-thesaurus and some more Bool's operators.

The main topic of discussion with regard to the retrieval of information is the future of the printed book. Prognostications are not new. 1894 Scribner's Magazine published an article "The end of books" which predicted that printing would be replaced by phonography. Stephen Gaselee said 1932 "It is not certain that the printed book will remain as the development of gramophons, radio and television may abolish the book as a curiosity". In the 1960s the advocates of microforms set no bounds of their uses in libraries and Robert Collison chief librarian of the BBC said that thanks to microfilm every branch library would be able to have all reference works listed in "Walford" and "Winchell". Today the situation is different. Philip Hills and Milton Keynes 1980 published the book "The future of the printed work".

Maurice Line, one of the authors of this book, made good points on the topic "Some questions concerning the unprinted word:

1. Electronic storage and access is economically inevitable for documents with a small readership such as research papers.
2. Computerscreens are not ideal either for scanning or for continuous reading.
3. It is easier to refer to several documents at the same time in printed rather than in electronic form.
4. Electronic media are less useful than the printed word in the underdeveloped countries."

The book "The impact of new technology on libraries and information centers" based on a report of a library association working party is rather cautious about the future but for this it can hardly be blamed. The principle point is that "the options open to the librarian for the provision of services to his users are increasing. They include remote retrieval systems, inhouse software packages, use of bureau services microcomputers, shared cataloguing systems and office technology". As for the future the report points to the problem of getting information from information systems which are not user friendly and to the question of who will pay for the provision of information obtained at cost from sources in libraries where the information services are traditionally free. In 1983 an information technology group of the library association was set up.

John M. Strawthorn, one of the contributors to the "Future of printed word" said: "We need to learn how best to get information out of one person's head into another's. We need to know whether to use the printed word, some other kind of visual display, another medium of presentation (aural, tactile or olfactory) or a combination of these".

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Information Services for the Public

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Abstract

Electronic Publishing has hitherto covered the areas of

- **Electronic Document Delivery**
- **Electronic Journals**
- **CD-ROM**
- **Image Processing and Optical Media**

This paper describes the possibilities offered by the electronic media for the publishing of community and local information, which includes material which is published in diverse paper sources or not published at all. Wide-scale integration of this kind of information is now possible and this offers an enhanced role for libraries as Information Centres for the provision of Information Services to the Public.

Information Services for the Public

The topics that are often mentioned in association with Electronic Publishing are:

- Electronic Document Delivery
- Electronic Journals
- CD-ROM
- Image Processing and Optical Media

In this paper I shall be discussing the possibilities offered by the electronic media for the dissemination of another type of information, namely Community and Local Information.

The traditional paper media have provided various almanacs, local directories and guidebooks, from differing publishers and available in local areas only. Large scale integration of this type of information is not possible without the help of the electronic media. The possibilities now available for integration offer new horizons for the publishing and sharing of information, and an enhanced role for Libraries as Information Centres and Information Managers.

Community and Local Information is mainly directed at the Public, but it is also directed at Local Government Departments and other organisations who have the roles of both Information Providers and Information Users. The definition of 'Public' is essentially infinite, and includes any individual or group and any point of view.

By analogy with a reference library, if there is only one book in the library, there will be few readers. Likewise, a useful Community Database has to contain all local information for it to be worth consulting, otherwise the users would do better to consult the Yellow Pages, than go to the Library to use a terminal or log-on with their home-user PC.

The art of building a Community database therefore lies in setting up a management structure which has input from all possible local government departments and local interest organisations, and in having a computer system and extended network which can serve the needs of the Information Providers and the Public. In particular there must be an easy-to-use data input facility available across the network. Information must be provided, not just dumped on the central facility. Libraries should be more than just Information dumps.

The nature of the information in the database must be completely unlimited in it's concept and the database structure must be able to adapt to any new kind of information that comes along. However, there must be a common and easy-to-use search technique based on the principles of browsing the available information, such that the user finds both information relevant to his or her original idea and information that he or she didn't know existed, but which might be relevant, i.e. the serendipity principle. The basis of this kind of retrieval is to have browsable indexes representing every facet of the information that might be relevant to retrieval. Non-indexed retrieval using keyword combinations should also be available for the rarer searches. Hypertext facilities for moving around the database non-sequentially are also essential in order to emulate the facilities available when manually browsing a paper copy of the journal.

Bringing these few concepts together we find that there is a list of facilities required that are only recently available from the electronic technology. The facilities are as follows:

- Large Databases
- Distributed Databases
- Sophisticated Browsing Techniques
- Hypertext Facilities
- Hierarchical Searching Techniques
- Thesaurus Controlled Subject Indexing
- Multi-lingual Subject Facilities
- Mixed Text and Image Processing
- Advanced Data Security Techniques
- Private and Public View Techniques
- PC-based Terminals for Local and Network Use
- Local Area Networks
- Wide Area Networks
- Gateways, OSI Communication and Satellite Databases
- Home User PC's

The Community Database therefore represents an electronic synthesis of a multiplicity of Information Sources. Central control of such a database is essential, in the sense of co-ordination of input from various sources, but each source must be free to provide it's own information and have full local control of that information. This approach minimizes the need for central data input, which would have a prohibitive cost, and it encourages many organisations to contribute their data. All data should in principle be available to be viewed by the public, but the data could include material which is private to the contributing organisation, so that the database can be used as a primary private source, and avoid the need for separate private and public systems. Public and private views of individual data records should be possible.

The nature of the data is primarily textual, but associated images should also be displayable where appropriate, e.g. with Tourist Information, or Museum Object Catalogues.

The types of data that might be included in the database would comprise the following:

- community/local information catalogue/full text records
- local studies material (e.g. Local History documents)
- museum objects catalogue records
- art collection catalogue records
- photographic and film archive catalogue records
- newspaper articles catalogue and full text records
- archive collections catalogue records
- maps catalogue records
- companies information records
- legal information full text records
- rights and benefits full text records

It can be seen that this list covers many aspects of the information handled by various departments of a Local Authority and other organisations.

The handling of such diverse data requires a common approach to subject indexing to bring the various data sources under a common subject term where appropriate. Then, when the user is browsing under a given subject term, he or she is made aware of the existence of relevant material from the different data sources.

The development of a suitable thesaurus is the main central co-ordination task for the system managers. There should also be wide scale co-operation for thesaurus development between neighbouring local authorities or across geographical regions, so that the various individual

Community Information Systems can link together and contribute their data in answer to a user's search.

The geographical definitions within a database or also important, and require central control as for the subject thesaurus. The structure of a geographical thesaurus is essentially hierarchical, and follows all the same types of elements as a subject thesaurus. Controlled use of the geographical names allows all data relevant to a location to be consistently indexed and retrieved. Consistency of subject and geographical indexing is the keynote to successful retrieval, and it seems impossible to escape the need for it.

The costs of running the system are borne by the Information Providers, with some public funds being used to sponsor the system and to cover general services and input from very small sources.

I would be happy to talk further to those of you that are interested along with a demonstration of the COIN System at the ALS stand, a system which fulfils all of the criteria discussed above.

That was the scheduled end of this talk, but having listened to the earlier papers in this Symposium, I would like to talk a little about the control of electronic publishing of the types listed at the start of this talk, particularly electronic delivery and electronic documents.

Some gloom was apparent in the early talks about the problems of getting, distributing and indexing the data. Bonnie Postlethwaite then went on to discuss the concept of the Global Library and the Scholarly Communications model. That concept has much in common with the concepts I have been outlining in relation to Community and Local Information.

There is a need for distributed input, distributed and central storage, centralised control, controlled subject indexing, simple and common user interface, peer group approval (which is comparable with central clearance of Community data), user group availability, geographical dimensions etc.

Centralised indexing, even if only at the level of a classmark is available for monographs and provided through a national source. This is not currently available for journal articles, and it will be necessary for cooperation from interested sources to achieve a common classification or subject indexing, a point raised particularly by Maurice Line. In the absence of some kind of indexing, the searcher must have the opportunity to explore the text personally through free text searching on ASCII copies of the text of the abstracts and/or articles. This means that two copies of the document are required, ASCII format for searching and sometimes for delivery, and image format for document delivery where the layout matters, or there are diagrams, tables etc.

Optical Character Reading (OCR) of a document is often achieved by processing a scanned image of a full page, and it would therefore be possible to store both the scanned image and the OCR ASCII interpretation of the page. The OCR ASCII version might contain errors, and the level of inaccuracy is very small and getting smaller as technology progresses. It would not be necessary to go through the expensive process of correcting the ASCII version to 100% accuracy because the inaccuracies would probably not be detrimental to free text searching, and an accurate document can be delivered from the full image. (I realise that this approach might double Bernard Gallivan's storage problems at the National Library of Scotland, but at least his readers would be able to find the documents!)

So, how should the data be gathered? I would suggest that the model offered by the management of Community Information is also relevant here, i.e.

- Information Provider (i.e. Publisher) contributes the material from input devices in his own premises, both the ASCII and scanned image versions. Many publishers now have electronic versions for typesetting purposes and they would have proof copies of the books and journals which can be scanned without guillotining the spines
- Central supervision of the input, including thesaurus control by a system coordinator (could this be another role for the British Library Document Supply Centre at Boston Spa?). This notion requires a library to be proactive rather than reactive, as suggested this morning by Ruth Wüst. It also references the idea of the knowledge workshop as mentioned by Maurice Line
- Data on hold until approved, with the possibility of restricted views of, say, titles and abstracts
- Archiving strategies

- Browsing and Retrieval through dedicated terminals and terminals gatewayed over networks. Browsing overcomes the difficulties of matching requests and documents because of inaccurately specified titles etc. and deficiencies in subject indexing
- The system could become the vehicle from which to produce printed journals, which could perhaps be produced less frequently, perhaps more as a retrospective cumulation. Also CD-ROMs could be produced with a similar cumulative function. The online availability of journal articles would also help to overcome the delays in the publication of journal articles, and the database would be attractive to users if it is more current than the printed publications. SDI (Selective Dissemination of Information) facilities could also be used to offer the possibility of online customised journals

It is currently not easy to buy a single copy of a relevant journal, or a journal article. Hence the need to apply to the Document Supply Centre for a photocopy of the desired article. The kind of data organisation just described would assist in providing the possibility for a user to 'buy' a relevant journal article with remote electronic request and delivery. There then arises the question of who should pay for the article, the library or the reader, but I cannot offer a solution to this problem!

Optical Disk Based Document Delivery at the Congressional Research Service of the Library of Congress

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Optical Disk Based Document Delivery at the Congressional Research Service of the Library of Congress

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Abstract

In 1982 the Library of Congress launched the first optical disk system using WORM disks. Optical disks pertain to the kind of technology with built in seeds for change in basic objectives of the institution as such. Clearly, optical disk technology will have an enduring impact on the way we access information. For the library community this impact will implay changes in the way they process information. Moreover, it might eventually cause a change in library structures.

Today, the optical disk system is being used by the Congressional Research Service to deliver journal articles to congressional offices. At this point, in a production mode as a document delivery system, it has come to a final stage of "real benefit and real value".

Optical Disk Based Document Delivery at the Congressional Research Service of the Library of Congress

The Library of Congress as has been remarked by its Librarian James Billington is at a crossroads in its history[1]. Now in its second century it has become the world's largest library, fulfilling a dual function as the library for the U.S. congress and as the inofficial U.S. national library. Its collections contain more volumes in foreign languages than in English and it houses tens of millions of special collections items[2].

A crossroads opens up possibilities and offers choices. It is technological change in communication proceeding at an ever accelerating rating that has brought the Library of Congress to the current juncture. The pervasive rush to digital technology will have enormous implications for the Library. By making use of new technology it has the opportunity to explore these possibilities and develop a new mandate which could expand its functions.

One such technology is digital optical storage technology. This technology makes use of digital optical disks with great storage capacities. For example, currently 12-inch disks can store up to 9 Gigabytes of data[3]. Information stored on optical disks is easy to replicate back to paper or microfilm. Exact digital copies can be generated without any loss of quality and improving retrieval techniques make them therefore attractive for libraries.

As early as 1982, the Library of Congress launched the first optical disk system to be installed at a library or for that matter the first system outside a laboratory. Optical disks pertain to the kind of technology with built in seeds for change in basic objectives of an institution as such. The Library's first hand experience in the application of this technology can serve as a guideline for future efforts in other libraries[4]. Optical disk technology was received at the Library with great enthusiasm at the beginning of the pilot project. It then moved from a stage of "unbridled optimism" to a period of "pessimistic depression" as the realities of the technology set in and a production application had to be decided upon.

At this point, now in a production mode, it has come to a final - however, not quite reached yet - stage of “real benefit and real value.“

At the 1986 Essen Symposium, Joseph Price, the director of the optical disk pilot project at the Library of Congress, presented the Library's experiences during the installation process of the pilot system[5]. At that time the system had just been opened to the public. In 1989, the Library finally ended the pilot phase and moved the system into production. As all projects dealing with new technology, it took longer to implement than planned and was more costly than expected.

An analysis of the project revealed that the effect new technology has on an organization is too often overlooked by libraries. Change in institutions due to the use of technology happens in three stages: First, automation of manually conducted procedures takes place. We use computers to do things faster and better. For example, at the Library of Congress the optical disk system was used to store journal articles in electronic form (as facsimiles or raster images). During this first stage no fundamental change takes place and we still rely heavily on either the printed page (printouts by a laser printer) or on an emulation (a raster image) of the printed page. In a second step the definition and nature of the work changes. For instance, the optical disk system is only now, nine years after its implementation, slowly moving in this direction. The system is now being used in production by the SDI (selective dissemination for information) service of the Congressional Research Service. Journal articles are scanned and stored on WORM (write-once, read many) disks, printed on demand and then sent to congressional offices. Characteristic to the second stage is that you use technology to do things you could not do before. But only in a third stage, as a result of these changes a transformation of society occurs. This, of course, is a continuous process and difficult to define for a single technology such as optical storage[6].

From the project's very beginning the Congressional Research Service (CRS) had suggested to use the optical disk system as a replacement for their microfiche based document delivery system[7].

In 1983, the optical disk pilot had started out as a public system where patrons could retrieve journal articles in the reading rooms, view them on terminals and either order a hard copy from a remote printer overnight or get a hard copy from a laser printer on-site. The critical and central issue of copyright restrictions were solved by acquiring time limited copyright permission by publishers whose material was put on disk. An external advisory committee consisting of librarians and publishers succeeded in steering the project around the dangerous cliffs of copyright infringements. Yet, these two measures also entailed a pitfall: Because the project was "officially" granted copyright permission for the limited pilot period, the Library was not pressed to solve the copyright issue on a broader level. The project solved the copyright problem only temporarily and postponed an overall solution. Negotiations over licensing terms were not settled during the pilot and in fact were never solved. The way this central issue was dealt with alludes to the way the optical disk project was handled as a whole. The project was technology driven and focussed on short term goals. These, as for example, to get the technology going, were solved, while long term goals such as the preservation aspect of optical disks or the above mentioned copyright problems are still being discussed. In the meantime companies such as University Microfilms International, for example, with its fulltext CD-ROM version of ABI Inform have shown that it is, of course, possible to deal with copyright issues entailing optical storage of information.

In February 1988 CRS began converting the pilot project into a production on-demand printing system. After a disastrous print test was conducted on the existing pilot system, new requirements were developed. The system was redesigned and modified to meet the CRS image system requirements. A contract was let in September 1988 and a new print facility was integrated and installed. Then in March 1989, the optical disk pilot project was moved into production for support of the Congressional Research Service.

The Congressional Research Service is a department of the Library of Congress. Its primary mission is to provide research, reference, and analytical services for the Congress of the United States. As Goodrum pointed out,

> the Library of Congress started as simply and solely Congress' library. Then, mostly because of an acquisition policy that seemed to accumulate anything convered with dried ink, it became a national library, and to be certain that Congress was not forgotten, the Legislative Reference Serivce was formed in 1914 to concentrate on Congress' library needs[8].

By 1989 it employed 830 people and produced nearly fifty million pages of information in response to more than 500,000 congressional requests.

The work of CRS is characterized by its nonpartisan research. For example, representative Sherley explained the research service as

> the hands and the eyes and the ears of Congress...No one desires to have Congress have some other body doing its thinking, but all of us would like to have the data collected that would enable us to arrive at better conclusions[9].

Most of the early optical disk systems were installed in records management operations where they replaced microform systems having already effective indexing subsystems. Such a system was already in place with one of the services CRS provides for the Congress, the Selective Dissemination of Information (SDI) system. Originally a paper file, in 1978 it was moved to a microfiche system. This microfiche system has helped CRS to nearly maintain its workforce while at the same time requests have increased from 173,000 in 1973 to nearly 500,000 in 1987. Each year 19,000 articles are added to the system. The average output, i.e. hard copies is now 200,000 pages per month. The work flow is as follows:

1. A policy analyst or bibliographer selects the article (CRS subscribes to about 1,200 journals)
2. The article is indexed and cataloged in an automated online file
3. The article is filmed on a step-and-repeat camera
4. The index and catalog information becomes available under the Library of Congress retrieval system
5. The film is processed, a microfiche and copies are produced
6. The microfiche is filed into the master file
7. Full size paper copy is produced on demand from a Xerox 970, a Tameran 1970 and a TDC scanner/microfiche enlarger/printer.

Over 900 congressional user subscribe to the system. Each week, according to their individual interest profile they receive a printout of the latest articles corresponding to their profile. They return the index cards of the articles desired and a hard copy of the document is delivered to their offices.

The shortcomings of this system were obvious:

1. There was the delay in providing the copies due to the time required to produce the microfiche (almost two weeks)

2. Due to the age of the system the output technology, the printers, started failing, a cost-effective replacement for the obsolete Xerox 970 machines could not be found.

3. With about 650,000 fiche, the size of the system placed a great demand on floor space and increased the percentage of erroneously filed fiche. Every month the order of the file was checked in an effort to maintain its integrity.

4. In order to retrieve fiche easily, CRS used one fiche for each document, thus often wasting a lot of the film's capacity when documents are only a few pages long.

5. During peak times the "master" fiche often was not available.

As said above, maintenance of an SDI file is a problem. In general, SDI document delivery has always been a highly labor intensive operation, run in an assembly line fashion. Documents must receive individual handling because most requests are for a changing pool of up to 1200 documents. They are received on an ongoing basis and are therefore hard to batch.

For CRS to move to an optical disk based operation meant increasing staff productivity by automating time-sensitive and labor-intensive tasks. Advantages are the following:

Time

In an optical disk operation, items can be scanned, quality checked, and written to disk in a matter of minutes in response to a rush request.

Security

The optical disk does not "lose" documents the way any humanly maintained file does.

Quality

The quality of the paper copy output improves. Copies from the microfiche printers often had to be printed two or three times before a usable copy was obtained.

Efficiency

With the microfiche system only after printing each document could the complete package of materials for an office be sorted and brought together. Now, ordered documents by an office can be requested from the system at one time. They will be printed sequentially and it is no longer needed to sort them.

With the optical disk system, CRS is for the first time able to get an overview on what type of printed information is requested by Congress. Because the system keeps tracks of every transaction, it is relatively simple to keep statistics on the process. Before, it has proven to be far too costly to manually count the cards and sort them, for example, according to the user profiles.

Beginning with March 1989, statistics are kept about the articles requested by Congress. It is now possible to not only see how many pages per day are sent to Congressional Offices but also what kind of printed information Congress requests. For example, during the last week of March 1989 1,606 items were ordered through the optical disk system resulting in a total of 22,451 pages printed from the system. The average length of an article scanned on optical disk is 15 to 17 pages. Selected articles are requested many times. In 1989, for instance, one dealing with environmental issues and one dealing with foreign aid were each ordered 26 times in March alone. Of the 2,928 articles ordered in March, 345 or 8 % were ordered more than 10 times. This means that the majority of the articles are requested only once, the top list being articles either dealing with current issues worked on by Congress or important articles of general interest. These are ordered up to 30 times during one month. It turns out that most requests are for a changing pool of up to 1,200 documents. For example, in March 1989 the article "Congressional Control of Foreign Assistance," in the Yale Journal of International Law was one of the current issue documents on the top list. George Kennan's article "After the Cold War" in the New York Times Magazine and an article of local interest "The Other Washington" in the Wilson Quarterly were also ordered many times.

Monthly production statistics for 1989 and 1990 were the following:

Number of Printed Pages

Month	Production	Production
1989	Monthly	Cumulative
April	51,439	51,439
May	56,749	108,188
June	80,431	188,619
July	66,735	255,354
August	97,861	353,215
September	75,016	428,231

Month	Production	Production
1989	Monthly	Cumulative
October	65,078	493,309
November	69,192	562,501
December	57,025	619,526

1990	Monthly	Cumulative
January	58,975	678,501
February	41,775	720,276
March	70,007	790,283
April	63,715	853,998
May	91,301	945,299
June	71,856	1,027,155

Under the current configuration CRS staff scan, i.e. enter, an average of 1,300 pages per day into the system. At the same time about 10,000 pages are printed on demand for the Congress. Major modifications were made and many of the original hardware parts of the pilot system were being replaced. Most of the original hardware was prototype material, while now with the optical storage technology having matured, off-the-shelf hardware was integrated by Integrated Automation, a Litton subsidiary. For example, the old prototype jukebox was first replaced by a 100 disk Hitachi jukebox which again has been superseded by a Cygnet jukebox.

The high speed double-sided scanner designed by TDC has survived in a modified form and scans at a rate of one page per minute. It is backed up by a Fujitsu multipurpose scanner. For printing CRS uses a high speed

Fujitsu laser printer which prints 32 pages per minute. It is supported by a Fujitsu low speed (18 pages per minute) printer used for rush requests.

In terms of retrieval the biggest improvement has been the replacement of the video display terminals by SUN SparcStations. Using windows the user can display in one window the bibliographic information and in another the full text of a whole page or staff can do quality review displaying a whole page of a document and simultaneously in another window scanning and status information of the system.

The on-demand printing system has proven to be an excellent application for a digital optical disk system. At the time of this writing, plans are approved and action is being taken to include remote printing, viewing and eventually distributing electronic document images to the Congressional offices on Capitol Hill.

To sum up, a short look at an issue which surfaced during the implementation of the optical disk system seems useful. It is the need for a guiding vision to motivate and sustain the long-term effort necessary for an organization to gain advantages through the use of new technology. Unfortunately, visions are often dismissed as too distant, too ambitious, or simply impractical. Nevertheless it is concluded that it would have benefited the Library of Congress to develop such a vision for its project in connection with a concept for the Library as a whole. But as Manfred Kochen noted:

> The Library's principal weakness has been lack of a clear and inspiring vision and a translation of that vision into sufficiently specific goals and objectives that are in keeping with major changes in technology, needs and patterns of use[10].

The thesis is put forward that it is above all the increasingly digital quality of information which will eventually force the Library of Congress, or for that matter libraries in general, to enlarge their goals. The Library has yet to perceive the magnitude of change the digitization of information will bring about.

Digitization offers not only new ways of storage, but of transmitting, distributing, and displaying information. The digital format immensely increases the speed, volume, and accuracy of information to be exchanged. Assuming, of course, that the information is accurate at the time of its input. Ways to deliver information and in general access to information will be affected by these opportunities. The mass storage capacity of optical disks combined with the digital format entails considerations about how to organize and access gigabytes of full-text or even multi-media materials as much as how to integrate them with the other, older information sources. It is, however, understood that digitization is just one of many aspects that account for change, but it is seen here as one of the most conspicuous. In addition, the digital format is a feature not restricted to optical disks alone, but for a library environment this technology is particularly amenable.

Optical media could become one of the dominant storage media for libraries in the future. However, we will deal with information stored on an increasing number of different media, digital as well as non-digital, but at the same time the mass of information itself is constantly increasing.

The Library of Congress needs to develop a vision as mentioned above. Without this vision it will have difficulty identifying new directions and eventually might lapse into stagnation. Paraphrasing the Cheshire cat this means: If you do not know or do not care where you want to go then it does not matter much which way you go. Often in the past, the optical disk project being one example, projects were set up asking: what can the technology do? Yet, a vision of the Library has to define what it wants the machines to do. So far computers mainly have helped the Library in maintaining its collections and keeping up with its usual procedures. But instead of simply enhancing the Library's "productivity," the vision should include ideas about a new responsiveness towards users' needs by the means of information technology. One could, for instance, envision new services to deliver information. If new technology is used to support productivity as well communication it will add to the Library's importance for society.

[1] James H. Billington, Statement before the Senate Subcommittee on Legislative Branch Appropriations on March 30, 1990, The Gazette, Library of Congress, April 6, 1990; Manfred Kochen, Extending the Human Record: A Vision for The Library of Congress in the Future, 1988, unpublished manuscript.

[2] These include photographs, audio recordings, film, maps, sheet music, etc.

[3] ATG Gigadisk offers now a 12-inch WORM disk - the GD 9001 - with 9 GB capacity. The drive can be combinded with a 1800 Cygnet jukebox with a capacity of 1269 GB on less than 20 sq. feet floor space.

[4] Ruth Wüst, The Optical Disk Project at the Library of Congress: A Case Study in the Use of New Technology in a Library Environment, Freie Universität Berlin, dissertation 1991.

[5] Joseph Price, "Optical Disk Program at the Library of Congress," Impact of new Information Technology on International Library Cooperation, eds. A.H. Helal and J. Weiss, Essen Symposium 1986, Essen 1987.

[6] John Diebold, Automation, New York, 1983.

[7] Personal conversation with Felix Krajeski, June 1989.

[8] Charles A. Goodrum and Helen W. Dalrymple, The Library of Congress, Boulder, 1982: 129.

[9] Goodrum, Library of Congress: 39.

[10] Manfred Kochen, Extending the Human Record: A Vision for the Library of Congress in the Future, 1988, unpublished manuscript, 109.

Hypermedia in the Library: Design Guidelines Based on Assessment Tests

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Abstract

Assessment tests and practical experiences have lead to design guidelines for hypertext systems. A library information system was tested twice by potential users. In this paper guidelines will be presented with regards to user groups, browsing and navigation through the system, structure of the system, help functions and integration with other systems. The results of these experiments may help other developers to improve the design of their systems. The proposals for developing a hypertext applications are:

- **Character set must consist of both pictorial and verbal elements and the metaphors must be carefully selected.**
- **It is only sufficient to offer one set of navigation tools to all users, because no significant differences could be found in user behaviour concerning browsing and searching facilities.**
- **Simple navigation instruments are appreciated by occasional users.**

- The orientation of the users within the system depends on the clear structure and it can be improved with a graphical browser.
- It is suggested to manipulate the data in a DBMS in order to solve the problem of data consistency and integrity.
- Integration of already existing systems is recommended, such as the online catalogue, a University information system or other local databases.
- Most of the system features can be evaluated in individual preliminary tests. General system characteristics such as response time or originality must still be analysed in a full field tests.

Hypermedia in the Library: Design Guidelines Based on Assessment Tests

1. Introduction

The library information system “Scout“ was developed at the Institute of Information Science for the University Library of the Graz University of Technology (Fasching 1991). Scout was designed as an electronic guide explaining the use of the library and it should be seen as an additional tool to the online catalogue of the library. As it was intented to offer Scout to all users of the library, it was essential to have an easy-to-use system. Therefore the hypertext system HyperCard was chosen to develop this application.

The application Scout consists of approximately 500 cards (screens like in figures 1 or 2). It gives information on the following topics:

- opening hours
- catalogues which are available at the library
- borrowing facilities
- undergraduate collection
- staffing
- floor maps for the orientation of the users

Figure 1 shows the menu card of this system. The item of interest can be selected by simple clicking. In order to become acquainted with the system a general introduction (“Ich möchte Bedienungshinweise“) is offered to the user to help navigating through the system. Due to the complex structure several navigation facilities have been implemented for browsing and searching. The control panel offers buttons to move forward, backward and up to a higher level. The “home“ button takes the user to the first card of the system; the index button displays the index; and the help button explains how to use the system. The “dimension selector“ enables the user to get information about who can serve you, what is available, how, where and when you can get it. For example, if you want to borrow a book, you just need to click the “when-button“ and you immediately get information about the opening hours of the lending desk.

Additional facilities such as full-text-search, "high-lighted words", index windows for browsing through the indices or help functions are implemented. The mouse is used as the only medium for interacting with the system. The underlying idea of the system is that the user clicks the location on which he wants to get more information.

Figure 2 may serve as an example and shows the third floor of the main library and the location of the Engineering Index on the shelves. Furthermore it illustrates how the control panel and the dimension selector are integrated into the card.

The library orientation system has been developed on an Apple Macintosh SE with HyperCard 1.2 and has been improved on an Apple Macintosh LC with HyperCard 2.0.

2. Assessment Tests

In order to investigate the acceptance of this application, the prototype (version 1) of the library guide was tested by potential users (Kappel 1991). Based on these results version 1 was modified (Bagary 1991). In the second assessment test both versions were evaluated (Schmidt 1991). Guidelines for planning, structuring, designing and evaluating a new hypertext system were deduced from these field tests and from practical experiences with hypertext systems (Bertha 1991, Schwarz 1991).

The assessment tests were carried out in the library and all readers of the library were free to use the system. Voluntary informants were questioned immediately after their hands-on experiences by standardized interviews and questionnaires. 35 persons were interviewed during the first assessment test and 68 in the second. The first assessment test showed that more than 90% of the informants were students. Therefore only students were interviewed in the second test (see figure 3).

The following items were evaluated:

- characteristics of the library patrons
- acceptance of computer equipment
- navigation through the system
- content of the system
- general system characteristics such as response time, clarity or originality of the system.

The data of these tests were analysed by the following statistical methods:

- frequency distribution
- calculation of mean value and standard deviation and
- chi-square independence test with alpha equal to 0.05%.

3. Results of the Assessment Tests

Characteristics of the library users were evaluated such as their occupations, their experiences with computers and the subjects of their studies. The small number of computer illiterates (10%, and 14% respectively) is in accordance with the fact that a basic knowledge of computing is required practically in all disciplines at university (see figure 4).

3.1 User Groups:

In order to find out if there is any significant difference in user behaviour, the informants were grouped according to the following characteristics and analyzed with the chi-square independence test:

computer skills	(programmers versus computer users)
subject of study	(technicians versus non-technicians)
sex	(female versus male) and
operating system	(Apple versus non-Apple users)

System features were explored such as dimension selector, control panel, index window, full text search, help button and information on demand. The user were also questioned about their opinions on general system characteristics such as response time, originality, understandibility or clarity of the system. The user groups were almost homogenous in judging the system features as can be seen in the matrix (see figure 5). Only the help button and the index window showed different user behaviour in the categories of computer skills and sex. The evaluation of the general system characteristics indicated that the items "originality" and "medium hypertext" were rated differently. Programmers and males are slightly more critical than computer users and females.

Inspite of the minor differences, the evaluation of the system features has shown that one form of navigation instruments can satisfy the needs of all users in a library. The tests have proved that there are critical user groups with high expectations. This fact must be taken into account in the designing process of such a system.

3.2. Navigation Tools and Structure of the System:

In version 1, the metaphors used for the buttons in the navigation tools were too abstract and hence not immediately understandable. Therefore the dimension selector and the control panel received overall low ratings by the informants. In order to solve this problem, the icons have been improved in the second version. The icons now consist of both pictorial and verbal elements (see figure 6). This combination is much easier for the occasional user to remember as the results of the second assessment test demonstrate. The new dimension selector was ranked much better than the old one on a four point scale (2.12 : 1.25). This result verifies the findings of Guastello (1989) that "mixed modality metaphors are rated as more meaningful than icons that utilize verbal or pictorial elements only".

Due to the network structure of this application a variety of navigation tools such as the dimension selector, the full text search, the "high-lighted words" or the index windows were implemented for the users. However, the assessment tests indicated that the number of these tools was too demanding for the library patrons. Therefore simple browsing facilities would be appreciated by occasional users.

The orientation of the users within the system will be affected by the structure. A complex network structure of the system is more confusing to the user than a hierarchical structure. Therefore the hierarchical structure has been used in the library orientation system of the University of the District of Columbia (Sarangapani 1991). Yet this type of structure will lack one of the main characteristics of a hypertext system - the network of associations. In order to reduce the feeling of being "lost in hyperspace" the orientation of the users can be improved by a stack-map (Conklin 1987).

3.3. Help Function:

Although a system should be self-explanatory, the tests have indicated that users require a comprehensive help system. This help system must consist of online information about the navigation instruments and the search facilities. Beside these help features a system demo should give a detailed introduction to the hypertext application. It is important that the patrons can always skip the demo whenever they want. An additional graphical browser can facilitate the use of the system especially when the hypertext application is not obvious in its structure.

3.4. Integration with other Systems:

A high percentage of the users have asked for a link between the library guide and the online catalogue. Therefore links to already existing systems as the local online catalogue are highly recommended. A CD-net is planned at the University of Graz and a link to the CD-ROMs could enlarge the number of available databases. The hypertext application should function as an easy-to-use interface to any other system such as national or international databases.

3.5. Data Management:

The problem of data manipulation, data consistency and integrity can be solved in two ways: in the HyperCard system itself or in an external DBMS. Some additional programming effort is needed to set up a module for comfortable data manipulation in the hypertext application. Therefore another approach is favoured where the data management is carried out by an integrated DBMS. The access to the data is performed via a well-defined interface. When the response time for the user is not adequate, a download of the data will speed up the performance of the HyperCard system.

3.6. Presentation and Location of the System:

Access to the system should be possible from several locations all over the library and the university campus. As the system is to be used in reading rooms in the library where silence is essential, sound effects should not be used. The assessment tests indicate that the mouse as an input device is favoured by the users - independent from their computer experience. The integration of colours can be an "effective tool in the recognition and identification of screen information" (Marill 1991).

3.7. Test Procedures:

The two overall assessment tests have shown that most of the system features can be tested in a preliminary test environment. If modifications of these features are necessary, they can be implemented more economically. General system characteristics such as response time or originality must still be part of summative evaluation (Sarangapani 1991).

4. Conclusion

The results of the assessment tests and of the practical experiences in setting up other systems are summarized as follows:

* There are no real differences in user behaviour concerning the use of the navigation and search tools in the tested library environment. Therefore the design of one system is sufficient for all potential library patrons.
* An essential finding of this experiment has been that especially the simple navigation tools have been highly accepted by the occasional users.
* Nevertheless it is necessary to present the navigation tools with easily understandable metaphors enriched by text.
* Other more complex search strategies such as full-text-searching have not been used often. To facilitate the use of this function, its description must be extended in the help system.
* The disorientation problem can be eased by using hierarchical structures. A strong hierarchical system will be understood more easily but it will lose some of its brilliance. Graphical browsers can be used to reduce the feeling of being "lost in hyperspace".
* Beside a comprehensive help function an introduction to the system should be offered as an additional facility. Computer guided search-"demos" should be included in the introduction of the system.
* In order to improve the acceptance of the users, links to existing systems on campus (e.g. online catalogue,..) should be envisaged. It is also advisable to consider integration of new information systems such as the display of announcements of lectures, exams, opening hours and other information. General access to such information from various locations means a better service for students or visitors.
* In order to manage the data in the system the integration with database management systems is recommended.

Acknowledgements

The authors would like to thank the following people for their support in the preparation of the research: HR Dr. Karl F.Stock for the access to his library, Mag. N.G.Berger for the discussion with the English version. Special thanks go to our students who have made contributions through their theses on hypermedia, Herbert Fasching, Herbert Kappel, Gudrun Bagary and Sabine Schmidt in particular.

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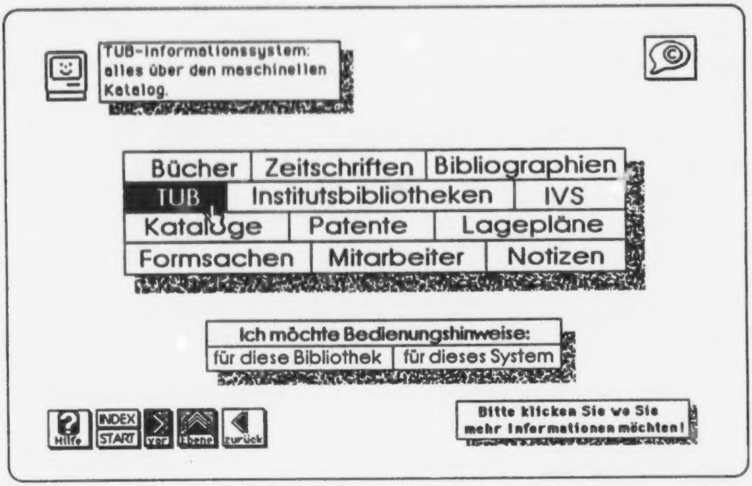


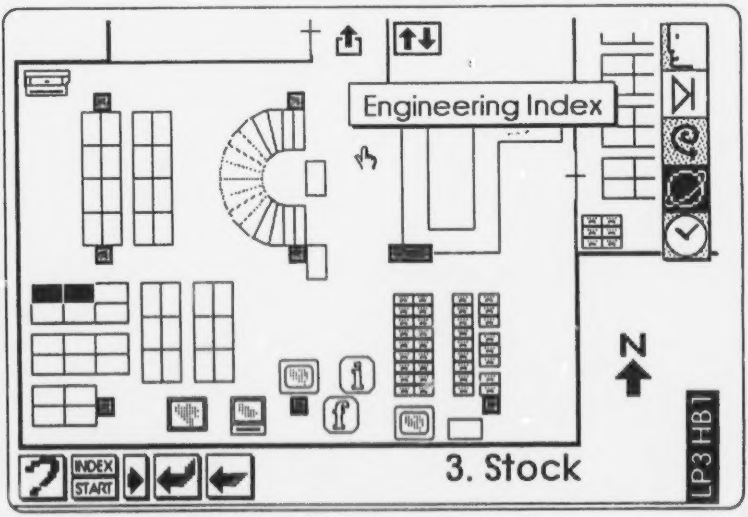
TUB-Informationssystem: alles über den maschinellen Katalog.

Ich möchte Bedienungshinweise: für diese Bibliothek | für dieses System

Bitte klicken Sie wo Sie mehr Informationen möchten!

Bücher
Zeitschriften
Bibliographien
TUB
Institutsbibliotheken
IVS
Kataloge
Patente
Lagepläne
Formsachen
Mitarbeiter
Notizen
Hilfe
INDEX
START
vor
Ebene
zurück

Figure 1: menu card



Engineering Index
N
INDEX
START
3. Stock
LP3 HB1

Figure 2: third floor of the main library

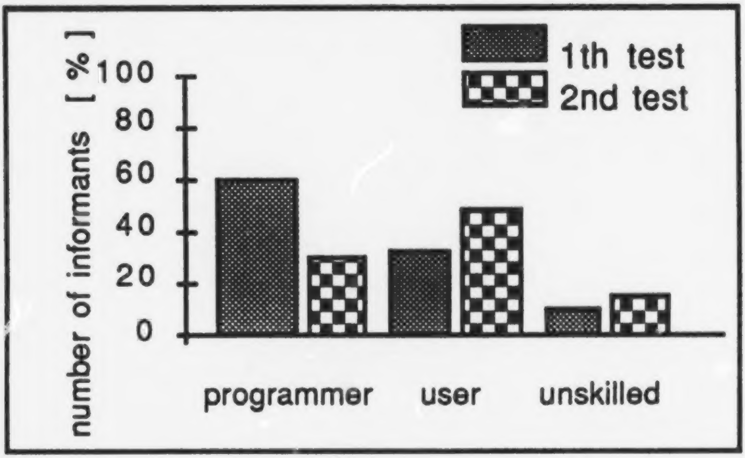


Figure 3: computer skills of informants

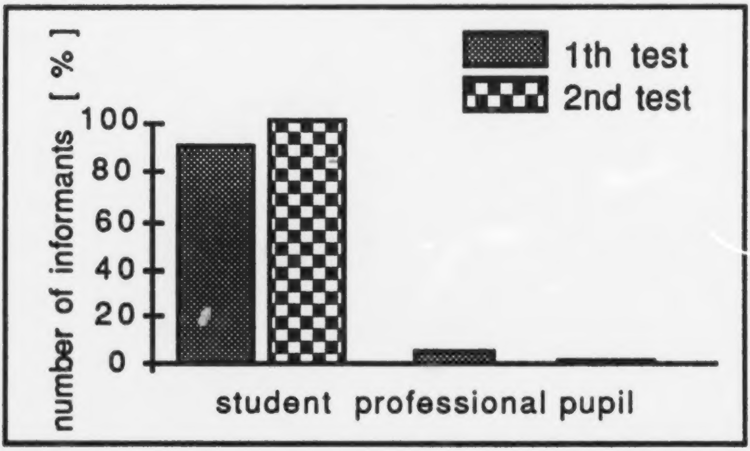


Figure 4: occupations of informants

Significant differences in user behaviour

Category Items	Computer Skill	Subject of Study	Sex	Operating System
system features				
dimension selector	no	no	no	no
full text search	no	no	no	no
control panel	no	no	no	no
index window	no	no	yes	no
mouse	no	no	no	no
information on demand	no	no	no	no
help button	yes	no	no	no
system characteristics				
originality	yes	yes	yes	no
understandability	yes	no	no	no
size of screen	no	no	no	no
clarity	no	no	yes	no
master of the system	no	no	no	no
purpose of Scout	no	no	no	no
medium hypertext	yes	no	yes	no
response time	no	no	no	no

Figure 5: table of significant differences in user behaviour

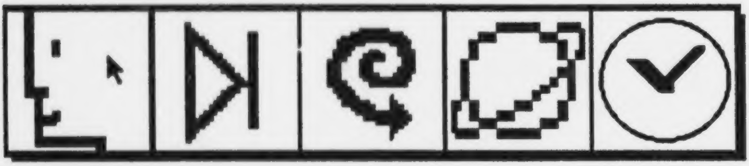


Figure 6a: dimension selector: version 1

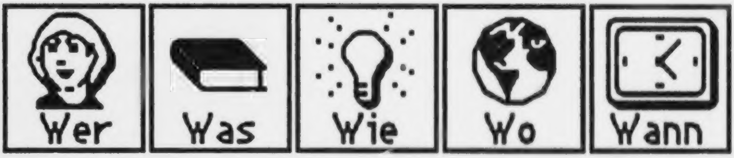

Wer
Was
Wie
Wo
Wann

Figure 6b: dimension selector: version 2

Libraries and Electronic Publishing: Promises and Challenges for the 90's

Conclusions and Comments

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Libraries and Electronic Publishing: Promises and Challenges for the 90's

Conclusions and comments

My concluding comments will not attempt to summarize all the papers and discussion that have gone before. Rather, I shall mention some of the points that seemed to me significant, and comment on them. I shall not refer to all of the papers, not because they were not all of interest but because some dealt with detailed local projects and did not raise so many general issues as the others.

Before I comment on the papers, however, I would like to ask why we are here at all discussing information transfer in an electronic age. Why are we not all sitting in our offices or homes, linked by electronic networks that enable us to talk and show slides, pictures and diagrams to one another? All of the formal proceedings could equally have taken place without us all being in the same place. What would have been missing?

In the first place, we would not have been able to benefit from the generosity of the commercial firms who have supplied us so well with food, drink and entertainment. (Should the Essen Symposium be renamed the Essen, Trinken and Tanzen Symposium?) But that by itself would not have been sufficient excuse for our assembling here - we could after all have had visual displays of food and drink on our screens, though this would admittedly not have been quite the same. More seriously, we would not have been able to interact with one another in twos and threes as we have been doing; we all know that much of the most important information communicated and business transacted during conferences takes place outside formal sessions. We would not have been able to renew old contacts and make new ones, some of them of direct use to our work or research. We would not have been able so easily to discuss details of papers with their presenters on a one-to-one basis. Above all, perhaps, the inspiration and energy generated by a good conference would have been totally lacking.

I have dwelt on this because it is all too easy to forget that the communication of information is a social process, not merely a matter of moving pieces of data from one computer to another. Information hermits may exist, but in future they will be very much the exception, and most of them will be much the poorer as information senders and receivers for their isolation. Any would-be system that ignores the social elements of information transfer is unlikely to gain wide acceptance.

It may be useful at this point to remind ourselves of some world-wide trends affecting libraries:

- acceptance of information as an economic commodity
- commercialization of information services
- market orientation
- need for greater economy and cost-effectiveness
- demand for value for money
- greater freedom in use of budgets, but with greater accountability
- diversification of media
- weakening of the conventional definition of "publication"
- more players in the information game.

Andrew Braid retailed to us some of the problems and barriers that can occur in electronic document storage and delivery, and did actually occur with Boston Spa's project. (The number of "teething problems" that occur in any project involving electronic technology suggest incidentally that a new profession of information dentist is needed). System designers tend to grossly underestimate the time-scale for implementation, fail to foresee the practical difficulties that are likely to arise, take insufficient account of the economics of real life application, and virtually ignore the psychological and social aspects. But there are many other difficulties, including standards and the acceptance of change by staff and users.

Andrew was the first but not the only speaker to mention the danger that libraries may be partly or wholly cut out of a future system - that information will be communicated to users direct from publishers or hosts, or even from authors. As he pointed out, in the UK JANET now has sufficient bandwidth to make direct transmission of scanned documents to users' desks possible. Does this actually matter? Librarians obviously want to preserve their jobs as a means of earning money to keep themselves alive, but this is equally true of other jobs and professions that have disappeared because they were no longer needed. In broad social terms, what matters is that information is conveyed to people as and when they need it efficiently and acceptably; who exactly conveys it, and how, are secondary considerations. If libraries do the job best, that is fine - they will continue to exist, though probably in a different form; if they do not, they deserve to die. There is no divine law that says that libraries should always exist.

Andrew also mentioned the formidable problems of copyright that will have to be solved. On what conditions will libraries be able to scan printed text for local storage and use, or be able to acquire by purchase or hire electronic files? Publishers are understandably worried that electronic files will go beyond their control; admittedly, the same is true of printed publications, but much more can be done much more easily to disseminate documents in electronic form.

Richard Dougherty raised several far-reaching questions. As he said, we are undergoing a paradigm shift; gradualism is being displaced by discontinuity, slopes by steps. This means that we have to consider the next step or steps that need to be taken; and this requires a leap of the imagination, and boldness in taking the step.

The difficulty is greater because librarians are not notable for their vision or entrepreneurial abilities; these qualities were not sought, or needed, when most of us came into the profession. It is greater still because of another major factor. We have to experiment with new media at the same time as old print media are still alive and flourishing. Both need money, and together they need more money than most libraries have or can easily get hold of. We shall have to make very convincing cases in order to obtain the required funding.

One of the obstacles to progress is that while libraries may be conservative, their institutions are often much more so, particularly academic institutions. We may, for example, want to rationalize our serials collections and move from a holdings to an access strategy, but researchers want the library to keep buying "their" serials, whether they actually use them or not, and no matter how much they cost.

Dick reminded us that libraries are only one of the stakeholders in the system; there are also authors, publishers, editors, indexers, suppliers, hosts, and readers. Any good system should suit them all - a requirement that is far from easy to satisfy, but one that the present publication system, for all its deficiencies, satisfies rather well. What seems to be ideally needed for scientific and technical journals is a dual system: conventional print-on-paper publication for current and recent issues, to facilitate scanning and browsing, and for back issues a compact form of storage that can be rapidly searched and from which articles can be easily retrieved. Such a system would of course involve the library in double expenditure; this problem might be solved by such measures as producing current issues in a much cheaper disposable form (for example, on cheap paper, possibly in newspaper format with four "normal" pages to a page), and by using remote sources for access to much of the older literature. However, there are several options, some of which have not yet been properly explored.

Dick was also right to point out that there is no one solution to the future provision of information. In universities it is a campus issue, not one to be solved by the library alone. It is in fact one that is fundamental to the function of universities, since learning, teaching and research are all heavily dependent on information. The question then is what resources should be devoted to information provision, and what role the library should have in this. I personally believe that there is a good case on cost-effectiveness grounds for allocating to information resources some of the money - by far the largest item in the academic institution's budget - that is at present used for teaching.

I would echo Dick's plea for more strategic vision and direction. Many librarians seem over-cautious, whether because they have no vision or because they do not want to turn over stones for fear of all the dangerous creatures which might creep out.

One of the messages I carried away from Johan van Halm's paper was the need for simple, non-bureaucratic accounting and other procedures. Even the best system can be ruined by requirements for (e.g.) separate invoicing and payment of every transaction.

Ulrich Korwitz returned to present and potential problems with ADONIS. Systems such as ADONIS raise the question "what is the unit of information - a book, a chapter, an article, a paragraph, or even a fact from a publication"? With full character-encoded text in electronic form it should be possible to extract just what one wants, without the surrounding unwanted matter; but is this what is wanted, even in science and technology? Will electronic technology, with the possibilities it offers for readers and searchers, gradually change the way scientists write?

Bonnie Postlethwaite's paper was on "The global library". Will it matter much, in a future of universal access, where books and journals are? It should be of less and less consequence for articles and other short items that can be transmitted easily by fax or online, but books are a different matter. Location can now be very fast, and requesting can be virtually instantaneous, but supply is still dependent on holding libraries, which often seem to regard remote users as of little importance, and on mail systems, which have shown no obvious improvement over the last decade or so (many would say that they have got worse). Nevertheless, cooperative schemes for national provision and supply seem unlikely to play a major role in the future; in Europe, we should see Europe-wide schemes. But in the last resort, libraries will decide where to send requests for documents on the basis of their assessment of the relative cost-effectiveness of possible sources.

Standards played a prominent role in Achim Osswald's paper. I am a little worried about demands for standards for everything. Premature, inappropriate or unnecessarily detailed standards can fossilize systems at a certain stage by preventing experiment or the development of better systems. I am not opposed to standards as such - some are obviously necessary if communication and record transfer are to take place at all - but we need to ask in each case "standards for what?", "why are they needed?", "how detailed should they be?", "when should they be introduced?" and "how long should they be in force before they are revised?".

Bernard Gallivan's paper, with its calculations of the scanning and storage capacities required to put the National Library of Scotland's holdings into an electronic format gave us all food for thought - not so much as to their accuracy as to whether this was what we really wanted. He was of course right to remind us that stocks cannot go on growing for ever, at least not in all libraries; the mere contemplation of the mass of information held by major libraries is frightening. Who will rid us of this vast accumulation of published material?

At one point I was irresistibly reminded of two verses from The Walrus and the Carpenter, from Lewis Carroll's Alice through the Looking Glass:

> The Walrus and the Carpenter
>   Were walking close at hand.
> They wept like anything to see
>   Such quantities of sand.
> "If this were only cleared away,"
>   They said, "it would be grand".
> "If seven maids with seven mops
>   Swept it for half a year,
> Do you suppose," the Walrus said
>   "That they could get it clear?"
> "I doubt it" said the Carpenter,
>   And shed a bitter tear.

I also had a vision of all the books in the National Library of Scotland having their spines sheared off and then a decision being made that it was too expensive to scan them - the Loose-Leaf Library, ideal for serendipity after a gale.

I must confess I have my doubts as to whether we should even try to put massive effort into preserving all this material. We tend, strangely, to regard something as sacred just because it happens to have been printed. Manuscripts are of no interest whatever unless they are very old or the writer becomes famous; if I ever became famous every scribble I had set down on paper since I was a child would suddenly achieve value. One could argue that all information was of potential value, including ordinary conversations in cafes and pubs (and over coffee at the Essen Symposium); what would we not give for a recording of Socrates arguing with his wife, or Shakespeare making jokes in a tavern? But we have to be extremely selective with manuscripts and conversations, although many of them would be of far more interest than much printed matter. Should we not leave some printed matter to rot? Could we perhaps solve many of our problems with a programme of Library Re-acidification, to hasten the demise of some printed material?

I wonder too if we should dismiss microfilm as an archival storage medium. It is known to last well over 50 years, whereas the life of CD-ROMs and other electronic media is un-known. It is of course possible to renew electronic files every few years, but the regular renewal of such vast files as Bernard was talking about would be a formidable task. It would be possible to make the best of both worlds by microfilming documents and putting a code on the film at the start of each new document, searching a bibliographic file for a document, retrieving the document required, and either using the film directly, printing it out, or feeding it into the computer for searching of the text.

To Nada Cucnik Majcen's plea for advice to less developed countries faced with new possibilities of information provision and at the same time with poor budgets and conservative attitudes on the part of users, I can only repeat what I said after her paper:

- Give a service even if it means stretching your resources beyond what you think they can stand.
- Build up demand and expectation to a level where users demand extra resources,
- Cultivate influential users.
- Motivate your staff by bringing them into constant contact with users.
- Try to design your whole system round users and their needs.
- Don't restrict your service to what you can easily do, for that will keep it at a permanently low level.
- Don't always react, proact.

Hans-Eric Malmberg maintained that libraries do not have a very strong purchasing power, and hence little influence over what happens in future to publications. This is probably true for books, where publishers seem to be substituting individual markets for diminishing library markets, but research libraries do constitute the main market for scholarly journals, and unless publishers find economic ways of selling to individuals they will retain some power. In any case, not all library sectors are the same. As for the paperless society, it does not exist and never will; the only question is whether it is generated at the producing or the receiving end.

Donna McCool and Maureen Pastine picked up several earlier issues, such as where the library stands in future and where it gets the money to invest in new technology. At this point I noted down three simple criteria by which I believe users will judge systems:

- Can I find out information by a particular author, or on a particular subject?
- Can I get hold of it quickly?
- Can I do both the above easily and with minimum effort?

I was delighted by Jennifer Walton's paper on information services to the general public. It is easy to dwell exclusively on the researcher, and to forget about the huge public out there - a body of which we too are members for many information purposes. Her emphasis on information rather than merely books was also welcome; what we all want in the last resort, unless we are book collectors, is not books but information (in which I include leisure). My ideal of the library of the future, whether public or academic, is not very different from what some industrial information services have already achieved: to become an Information Nerve Centre, controlling the provision and supply of information to the authority as well as the user community by use of all the relevant technology, including the local computer unit - at the same time a switching centre and a control centre. A collection of books can be marginalized, an Information Nerve Centre cannot.

Finally, Eva Bertha and Erich Schwarz, in their discussion of hypermedia, brought us back yet again to the fundamental questions of what information is needed - for everyday living, for work, for leisure, for administration, for learning and for research - and how it is best provided, in format, speed, ease of use and accuracy. Hypermedia have a lot to offer, though at present their promise is yet to be fulfilled. Expert systems have even more to offer, I believe, for example in enabling a user at a workstation to access different files as if they were one. If he or she wants material on a subject, it should not matter whether it is recorded in a commercial database like BIOSIS or the local library catalogue. If we could have systems like this we could scrap most of our schemes of user education, so often an expensive and largely ineffective substitute for making the library usable in the first place.

There are numerous deficiencies in the services we offer at present. They can be summarized as poor management, narrow vision and short sight, overload and poor selectivity, multiplicity of databases and systems, and poor subject access. We need to replace these by fresh visions, new attitudes, user-oriented systems, and cost-effective management. "We" include all concerned with the handling and processing of information: authors, publishers, editors, database hosts, software designers, librarians, and information scientists.

If I have in these comments strayed at times well beyond the topic of a paper and introduced new issues, I do not apologize, for I feel that they are of importance; and it is really to the credit of the speakers if they have provoked me into fresh thoughts. Least of all do I apologize for repeatedly bringing in the user, for without users we would have no future at all, or for that matter no present.

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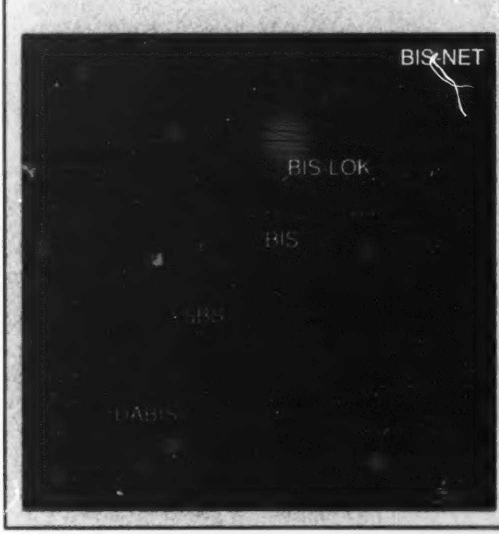

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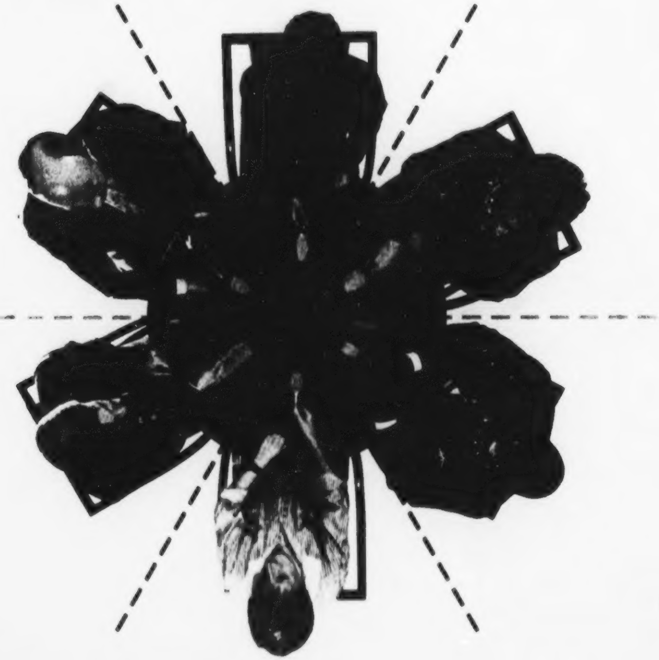

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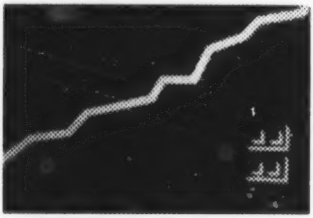

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12 October - 15 October 1992

ISSN 0931-7503
ISBN 3-922602-15-0